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BY A

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PREFACE

TO THE

SEVENTH VOLUME.

AT the commencement of the volume which is terminated by the present number, we informed our readers, that an arrangement had taken place, which would in future confine the work principally to critical analysis, admitting besides, only a small quantity of miscellaneous medical intelligence. The exclusion of original communications, allows us to give a much fuller and more comprehensive account of a work, than could otherwise be done, and we flatter ourselves, that our readers have already seen the advantages of this arrangement.

In conducting this work, our first and principal object is, to afford such a condensed view of respectable publications, as will make known, in a moderate space, the most valuable facts and experiments, and the most important particulars of Theory and Practice contained in them; the next, to offer such critical observations as seem to be required. On the execution of this plan, it does not become us to make any remark; we may be allowed however to observe, that it shall always be our endeavour, by acting with independence and impartiality, to render the LONDON MEDICAL REVIEW worthy of the distinguished support which it was hitherto experienced. It gives us pain to exercise severity in criticism, but our duty to our readers and to the public renders it sometimes necessary. Where merit exists, we feel a pleasure in noticing it; but it would be highly injurious, as well to the science of medicine, as to public safety, if errors were overlooked, or hasty and injudicious reasoning passed over unnoticed.

Since the commencement of the present volume, an event has taken place, in the return of peace, of extreme importance, both in a political and a scientific point of view. Every friend to learning must rejoice at the additional opportunities afforded, of intellectual communication between this Country and the Continent, which cannot but be favourable to the improvement of every branch of literature and

science,

science, more particularly to Medicine and Medical Philosophy. We shall always endeavour, either by means of original works, or the accounts given of them in foreign Journals, to make our readers early acquainted with the most valuable productions of the continent.

Within the period occupied by a volume of the Medical Review, few occurrences can be expected of much importance in the history of the Science. The Cow-pox still continues unrivalled in singularity and importance, and gains ground, as well in the estimation of respectable practitioners, as among the more enlightened and candid out of the profession. But Vaccine Inoculation is still far from a general practice, and though philanthropic men look forward with ardour, to the time at which it shall have completely exterminated the Small-pox, yet that period appears to us at a very considerable distance. Much however may be done, in removing the obstacles which resist its progress, and particularly the prejudices existing among the lower orders of society, by the active exertions of Medical Practitioners, and by the endeavours of the Clergy, and other enlightened men out of the profession. The prevention of Small-pox, is indeed an object of so much national importance, that it is well worthy of consideration, how far it ought to be patronized by the Legislature.

The formation of an establishment in the metropolis, for the cure and prevention of fevers, is a subject which has met with a good deal of discussion. Such an institution, when we consider the situation of many of the poor, afflicted with fever, seems likely to be productive of much advantage; but we entertain much doubt, that an establishment sufficiently extensive to carry into complete effect the plan proposed, can be made by voluntary subscriptions, without an aid from government, or a parochial rate. As we understand, however, that a house is now taken for the purposes of the institution, there will soon be an opportunity of judging of the practicability of an enlarged plan for the cure and prevention of fever, and with what success such a plan will probably be attended.

On looking over the contents of the seventh volume of the London Medical Review, which we now conclude, we flatter ourselves, that our readers will see many articles of importance. Of these it is not necessary to take any retrospect; and we shall only further observe, that in the subsequent management of this work, it is our determination, to act with that independence and liberality, which can alone give a periodical publication any claim to public favour or support.

CONTENTS

CONTENTS

OF THE

SEVENTH VOLUME.

ANALYSIS OF ENGLISH BOOKS.

Mr.

ANALYSIS OF FOREIGN BOOKS.

M. *Degean*,

MEDICAL INTELLIGENCE.

THE

THE

LONDON MEDICAL REVIEW.

VOL. VII. N° XXX. AUGUST MDCCCI.

ART. I. *The Doctrine of Phlogiston established, and that of the Composition of Water refuted.* By JOSEPH PRIESTLEY, L.L.D. F.R.S. &c. &c. Octavo. 90 pages. Northumberland (America) printed by KENNEDY, and sold by JOHNSON, London. 1800. Price 3*s*. 6*d*.

AMONG the most able advocates of the doctrine of phlogiston, which was first taught by the celebrated Stahl, and continued for a long time the favourite theory of the chemists, we may surely rank Dr. Priestley; for while many a gallant champion has been made to bite the ground, and some of the most powerful defenders of the Stahlian faith, for instance Kirwan, have gone over to the enemy, and fought under his banner, our hero, though attacked by the most celebrated chemists of England, France, and America, returns undismayed to the charge, and boldly lays his hand upon the palm of victory, presenting the work before us to the public, "as a *demonstration of the doctrine of phlogiston*, and a complete refutation of the composition of water."

The celebrity which Dr. Priestley has justly acquired as a philosopher, must give considerable weight to so bold an assertion, and may prevent those who are not initiated into the interesting and useful science of chemistry from engaging in the study of it, from an idea that its fundamental doctrines are fluctuating and uncertain: on this account, we shall examine the arguments of this almost only remaining, and undoubtedly

 best

best advocate of the old school *, step by step, and endeavour to shew, that though they are ingenious, and present difficulties that are formidable, yet they are by no means unanswerable. Our readers will therefore, we hope, excuse us, if we take up more pages in the examination of this work than are generally allotted to publications of similar size; both the importance of the subject, and the celebrity of the author, demand this at our hands. We shall, therefore, transcribe the most important of his arguments, and offer a few remarks on each.

In the fifth page he says, "the most simple of the experiments that I have proposed for discussion, with a view to decide concerning the merits of these two theories, and which I cannot help thinking furnishes an argument no less than demonstrative of the fallacy of the antiphlogistic hypothesis, is that of the solution of iron in the vitriolic and marine acids. Here the question to be solved is, from which of the substances present comes the inflammable air that is procured in the process. The phlogistians say it comes from the iron; and the antiphlogistians, from the water. But to this I object, that since, according to their own hypothesis, water consists of about six times as much oxygen as it does of hydrogen, there must be a large deposit of oxygen in the vessel, and that I cannot find it there. That it is not in the acid, appears, as the antiphlogistians themselves say, by its saturating no more alkali after the process than before. They, therefore, say, and there is no other alternative, that this addition of oxygen is in the iron.

"But I ask, How does this appear? If there be any addition of oxygen in this case, it must shew itself either by an addition to the acid, or by its being exhibited in the form of dephlogisticated air, called by them oxygenous gas. The former is not pretended; and so far is the latter from being true, that if the precipitate be exposed to a red heat, it yields much less

* Dr. Priestley seems feelingly to lament the rapid progress which the antiphlogistians are making in every part of the world. "Dr. Black, in Edinburgh," he observes, "and, as far as I hear, all the Scots, have declared themselves converts; and, what is more, the same has been done by Mr. Kirwan, who wrote a pretty large treatise in opposition to it. The English reviewers of books, I perceive, universally favour the new doctrine: in America also, I hear of nothing else. It is taught, I believe, in all the schools on this continent, and the old system is entirely exploded. And now that Dr. Crawford is dead, I hardly know of any person, except my friends of the *Lunar* Society at Birmingham, who adhere to the doctrine of phlogiston."

pure

pure air than the same quantity of the acid without the iron would have done."

In answer to this, it may be observed, that by precipitating the iron from the solution by means of an alkali, the precipitate will be found heavier than the metal was before the solution, which addition of weight has been caused by oxygen; for if this precipitate be mixed with a proper quantity of charcoal, and exposed to heat, the original quantity of iron may be procured in its metallic state, while a quantity of carbonic acid comes over, which is known to be composed of carbon and oxygen. But the iron has not acquired this oxygen from the acid, for that has undergone no alteration, as may be proved by the quantity of alkali which it will saturate. Besides, iron will not dissolve in an acid unless that acid be previously diluted with water: now if, when oxygenous and hydrogenous gas are burned together, water is produced, and if, in the solution of a metal, the quantity of acid remains undiminished, while the metal is increased in weight, which cannot be denied; this increase must come from the water; and what farther proof can we require than that the augmentation in weight of the iron, together with the weight of the hydrogenous gas procured, should be equal to that of the water which has disappeared? Moreover, when we know that it is oxygen which is combined with the iron, by its forming carbonic acid with carbon; and likewise that the weight acquired by the iron, is to the weight of the hydrogen gas procured, as 85 to 15, which are the same proportions in which these gases unite to form water; is any thing in chemistry more satisfactorily proved?

The Doctor, however, has recourse to experiment in confirmation of his opinion. In page 6th he says, "for this purpose I took as much vitriolic acid as I had found in the experiment recited in vol. iii. p. 197, of my Observations on Air, (in three vols.) to have yielded 130 ounce measures of dephlogisticated air, of the standard of .15, which is extremely pure, and saturated it with iron. But after this it yielded only 52 ounce measures of air, of the standard of .55, which is much less pure. This shews that this precipitate is so far from containing more oxygen, that it contains less than the acid. It is in reality possessed of the opposite principle, which is agreeable to the phlogistic theory."

The account of this experiment is by no means intelligible. The Doctor speaks of a precipitate, but does not say whether

he precipitated the iron from its solution in the acid; if so, we know that the oxyd of iron thus precipitated, will not yield oxygen by heat, without the addition of carbon, or some substance which has a stronger affinity for the oxygen than the iron has.

The Doctor proceeds to observe that "Dr. Maclean says, p. 19, 'There is the most satisfactory evidence that iron, 'after its solution in sulphuric acid, is in a state like that of the 'black oxyd, or finery cinder.' But the dephlogisticated air which is yielded by this precipitate is all procured before it comes to this form of a calx. After it becomes black, in which state it ought to contain more oxygen in proportion to its bulk than before, it yields no oxygenous gas at all."

The black oxyd is, however, the first degree of oxydation of iron, or its nearest approach to a metallic state; and we should therefore expect, that as the red oxyd of iron gave out oxygen, it would approach to the state of black oxyd, which contains less of that principle.

He farther says, "also, neither in this, nor in any other state, will it oxygenate muriatic acid, as minium, and some other substances which contain dephlogisticated air, do, which however easily dissolves it. It, therefore, shews no sign of its containing any oxygen at all. The new theory, however, requires that it be dignified with the appellation of the black oxyd of iron. The black oxyd of manganese gives more evidence of its right to the name they have given to it, though, according to them, it contains much less oxygen. It is evident, therefore, that there is no addition of oxygen in this process, consequently no decomposition of water in the case, and that the inflammable air must come from the decomposition of the iron."

We know, however, that it is not every substance containing oxygen that will oxygenate the muriatic acid; for that effect can only be produced when the muriatic acid has a greater affinity for oxygen than the substance which contains it; or when a substance, for instance, a metallic oxyd, is combined with more oxygen than it can contain, when dissolved in that acid; in this case, the superfluous oxygen combines with and oxygenates the muriatic acid. The oxyd of zinc and some other metallic oxyds are soluble in the muriatic acid, but do not oxydate it.

At page 8, he says, "I would also ask, if an acid will not dissolve iron till it be oxydated, but will do when it is, why will

will not the acid of vitriol dissolve the black oxyd of iron, or finery cinder, more readily than it does iron? since in this substance it finds the iron already abundantly oxydated; and yet the reverse of this is the case."

That the solution of finery cinder in diluted sulphuric acid is not so rapid as the solution of iron in the same acid, will excite no surprise, when we consider that iron is more oxydated by the decomposition of water in a red heat, than by a solution of it in diluted sulphuric acid, much less hydrogenous gas being procured from the same quantity of iron by the latter method than by the former; hence, as less water is decomposed, less oxygen combines with the iron. But it is a fact well known to chemists, that the attraction of the sulphuric acid for the oxyd of iron is so much weakened by an addition of oxygen to the latter, that it is precipitated from its solution; for on mixing oxygenous gas with a solution of sulphate of iron, a quantity of oxyd of iron is instantly precipitated; even mere exposure to atmospheric air will produce this effect. The rust of iron, which is a higher degree of oxydation than the black oxyd, can only be dissolved with great difficulty, and in small quantity, in the sulphuric acid.

In the same page the Doctor observes, that "inflammable air is procured when one metal is precipitated from its solution by another in its metallic state. This is a fact that is very easily explained on the supposition that the metal precipitated does not require so much phlogiston as that which is dissolved; but the doctrine of the decomposition of water cannot, as far as I see, account for the fact, at least in an easy and natural way.

"When zinc is used to precipitate lead from a solution of sugar of lead, inflammable air is procured; and according to the phlogistic theory it ought to be so, since lead contains much less phlogiston than zinc; so that when the former is revived by means of the latter, it is able to furnish more than is requisite for the purpose. But if this inflammable air came from the decomposition of the water, the oxygen, which must be developed at the same time, ought to be found either in the water, or in what remains of the zinc. For it will not be pretended to be in the lead that is revived, and there are no other substances present."

Of this fact we have some doubts; for we do not recollect inflammable air being procured when lead is precipitated from the acetous acid by zinc: but even supposing it to be so, it may be easily explained on the supposition that zinc requires more

more oxygen to render it soluble than lead does: it will, therefore, not only take the oxygen combined with the lead, but decompose part of the water, and thus hydrogen gas will be disengaged.

"My experiments," says our author, "prove to demonstration, that nitrous acid is wholly composed of dephlogisticated and nitrous air; since, when they form this acid, they unite without any residuum, or so small as not to enter into any computation. Had there been any phlogisticated air in either of these component parts of the acid, it would have appeared on their uniting, and thereby losing their aerial state. For as neither of them will unite with it, it must then have appeared in its proper form. If, therefore, in any process phlogisticated air be formed by means of nitrous air, one essential ingredient in the constitution of that air must come from another source; and all that can be said is, that the nitrous air furnished one component part of it.

"But phlogisticated air is produced by heating iron in nitrous air. Something, therefore, must come from the iron in order to form it, and consequently iron cannot be a simple substance; and if iron be a compound, it will not be questioned but that other metals must, from analogy, be compounds too."

Nitrous gas, or, as the Doctor calls it, "nitrous air," is now known to be composed of azote (his phlogisticated air) and oxygen; and nitrous acid is formed by the union of this gas with still more oxygen: when, therefore, iron is heated in nitrous gas, it will attract the oxygen from it, and what remains will be azotic gas, or phlogisticated air.

In the second section Dr. Priestley proceeds to the consideration of finery cinder, and observes, that "the great question between the advocates for phlogiston and their opponents is, whether the substance that has usually been called finery cinder, which is formed by the contact of steam with iron when it is red hot, be a proper oxyd of iron, that is, whether it contain any principle which can be exhibited either in the form of an acid, or of dephlogisticated air; and yet this, which is the only proper evidence in the case, has not been given. To say that it forms water when heated in inflammable air, and that water cannot be formed without oxygen, is taking for granted the very thing to be proved; since the water so procured, I say, is that which was imbibed by the iron, and is now expelled on the introduction of the phlogiston with which it had parted."

In answer to this we may observe, that when finery cinder is formed by the combustion of iron in oxygen gas, which beautiful experiment was first made by Dr. Ingenhousz, and since repeated by almost every chemist, the weight of the oxygen gas is diminished, and that of the iron increased; and this augmentation of weight in the iron corresponds with the diminution of it in the oxygenous gas: moreover, if the quantity of iron be sufficient, all the oxygen will be absorbed by it, and will augment its weight. If this synthetic proof of the composition of finery cinder be not sufficient evidence that it contains oxygen, we do not know what sort of proof will satisfy the Doctor. Suppose that we were unacquainted with the means of decomposing any neutral salt, for example, Glauber's salt; if we could form this salt by combining sulphuric acid with soda, can there be any doubt that it is composed of these principles?

Page 12. "It is evident to me," says our author, "that though the pure air, or oxygen, disappears in this process, it is not imbibed by the iron, but only the water which was its base, and which formed at least the principal part of its weight; the pure air, or oxygen, serving to form the fixed air which is always found in this process, and which cannot have any other origin. Consequently, the calx of iron, so formed, when heated in inflammable air, gives out nothing but water. The quantity of fixed air produced in this process appears to me to be quite sufficient to take all the pure air that disappears in it."

No fixed air, (carbonic acid,) however, is formed, if pure iron and oxygen gas, likewise in a state of purity, be made use of; and even that which is produced in common experiments, is in too small quantity to account for all the oxygen that disappears; for the same quantity of oxygen gas will form with carbon a much greater quantity of carbonic acid. Besides, the antiphlogistians will by no means grant Dr. Priestley's supposition, that water is the base of the gases; on the contrary, Mr. Rupp has proved, by direct experiments *, that this is not the case. Dr. Priestley was not able to expel the carbonic acid from barytes by mere heat, which has since been done; but procuring large quantities of it by means of steam, at the expense of some water, he thinks it must be concluded, that the water has combined with the carbonic acid, and converted it into a gas, constituting above one half of its weight. Mr. Rupp dissolved carbonate of barytes, carbonate of lime, and other carbonates, in diluted muriatic acid. The whole being

* Manchester Memoirs, vol. v.

weighed

weighed before and after the solution, the loss gave the quantity of carbonic acid which had been expelled. The earths were then precipitated by the sulphuric acid, and the sulphates being carefully edulcorated and weighed, the quantity of earth could easily be estimated from Kirwan and Bergman; and it always appeared, that if the weight of the carbonic acid which had escaped were added to the weight of the earth, it made up the full weight of the carbonate before experiment, or as near as could be expected; whereas, had the gas contained water, the earths would have weighed as much more as this water amounted to. But as the weight of the pure earths and the carbonic-acid-gas together, corresponded with the original weight of the carbonates from which they came, it follows that nothing extraneous entered into the composition of that gas, except the caloric, which is necessary to its gaseous state. The inference also which Dr. Priestley has drawn from his experiments on this subject, viz. that the greater part of the other gases is water, must fall to the ground; the substance, therefore, which is produced by heating iron in oxygen gas, is an oxyd of iron; and being one and the same thing with finery cinder, this too must be an oxyd of iron.

Page 13. "The solution of red precipitate," says the Doctor, "heated with a burning lens in atmospherical air, causes an addition to its quantity, from the dephlogisticated air expelled from it; whereas, when the solution of finery cinder is treated in the same manner, the contrary effect is produced. The quantity of air is diminished, and the remainder is less pure than before. The same was also the consequence of heating the solution of iron in the same circumstances, that of finery cinder precipitated by caustic volatile alkali, and of iron itself treated in the same manner.

"Since, therefore, finery cinder, both in this solution and without it, has the same effect on the atmospherical air in which it is heated that iron has, I conclude that they both contain the same principle, though the finery cinder has much less of it than the iron. The same is probable from finery cinder being in some degree attracted by the magnet. So far, therefore, is finery cinder from containing any oxygen, that it contains some of the opposite principle."

These experiments only prove, that in finery cinder, the iron, though containing a considerable quantity of oxygen, is not fully saturated, but attracts oxygen from the atmospheric air in which it is heated: they prove likewise, that finery cinder differs from iron by being combined with some oxygen, since it

it is sooner saturated with oxygen, and consequently takes less of it from the atmospheric air than iron does.

"Another probable evidence," he says, "of a calx containing oxygen, or dephlogisticated air, is, that when it is revived in inflammable air, fixed air is produced. But this is not the case when finery cinder is revived in these circumstances, though I purposely prepared some by melting iron in the open air; in which case I had imagined that some pure air would be attached to it."

This we deny, and affirm, that fixed air (carbonic acid) is never produced from a metallic oxyd when reduced by means of hydrogen gas, unless the oxyd contain some carbonaceous matter, or carbonic acid; water being always produced by such a reduction.

In page 15 our author proceeds to say, that "because the calx of mercury derives its additional weight from dephlogisticated air, the antiphlogistians have too hastily concluded that all metallic calces derive their additional weight from the same cause. But this is not by any means a just inference. For the calces of some metals are, in this and other respects, very different from one another, and even the different calces of the same metal.

"Finery cinder, for example, is a very different thing from the common rust of iron, consisting of different principles. From finery cinder nothing can be got by mere heat, but from the rust of iron a large quantity of fixed air is got in the same process. From 1277 grains of rust I got 45 ounce measures of air, of which only about one thirtieth part was not fixed air."

It is well known, that rust of iron is a carbonate of iron; the metallic oxyd, as it forms, imbibes carbonic acid from the atmosphere; and it is evident that this carbonic acid will be expelled by heat in the form of gas.

The Doctor farther observes, in the same page, that "what makes it almost a certainty that the water which is found on the revival of finery cinder in inflammable air has not the source that the antiphlogistians suppose, is the great difference in the quantity which is found in this case, and that of the revival of other calces in it. Dr. Maclean says, p. 11, 'When 'oxyd of mercury is reduced in hydrogen gas, that disappears, 'no oxygen gas is obtained, but a quantity of water may be 'collected.' Now I am confident that no person who had ever seen the experiment could have written this. The quantity of water that appears in this case is barely perceivable, being

no more than sufficient to constitute the base of the inflammable air imbibed by the calx, or that might have been concealed in the substance operated upon; whereas when finery cinder is revived in the same circumstances, the water forms itself into hundreds of small drops, which unite, and run down the inside of the vessel in all directions."

The Doctor himself allows, page 11, that finery cinder contains more oxygen than lead; "for the addition to its weight during calcination is nearly one third; whereas the addition to the weight of lead, by making it into minium, is only about one tenth of its weight." From this we should certainly expect that much more water would be produced on the reduction of finery cinder by hydrogen gas, than on the reduction of lead by the same substance. The same may be applied to mercury.

"Now," says the Doctor, "if this water was really formed by the union of the inflammable air in the vessel with the oxygen expelled from the calx, they ought, surely, to unite in the same proportions, in order to form the same thing. The antiphlogistians themselves always say, that the proportion of hydrogen and oxygen in water is universally 15 parts of the former to 85 of the latter. Here, therefore, is much more water produced than their principles can account for. The same quantity of inflammable air disappears, but the same quantity of water is by no means formed. The obvious conclusion therefore is, that in the case of the calx of iron, the great quantity of water produced was simply expelled from the calx when the inflammable air was imbibed; whereas the calx of mercury contains little or no water to be expelled, and only unites with the phlogiston in the inflammable air that disappears."

That the same quantity of hydrogen gas disappears in reducing equal weights of these two calces, we deny; and believe it will be found that the quantity of water produced is always in proportion to the quantity of hydrogen that disappears.

After quoting Dr. Maclean's assertion that finery cinder will rust, Dr. Priestley adds, "but in direct contradiction to what he asserts, I still say, that finery cinder is not subject to rust."

It is very probable that the rusting of iron in the common temperature of the atmosphere, is owing in a great measure to a decomposition of water; or at least, water is necessary in this operation, since no rust can take place without moisture. Iron confined in dry oxygenous gas, will not rust. From this we may learn, why finery cinder, which has been made in a high temperature, will not rust in the ordinary temperature of

of the atmosphere: for being already combined with a large portion of oxygen, its remaining attraction for it is too feeble to decompose water.—When moistened, and exposed to heat, finery cinder will, however, rust very easily, being converted into a red oxyd by the absorption of more oxygen.

In the third section our author treats of *inflammable air procured from finery cinder by charcoal.* "If," says he, "inflammable air, or hydrogen, be nothing more than a component part of water, it could never be produced but in circumstances in which either water itself, or something into which water is known to enter, is present. But in my experiments on heating finery cinder together with charcoal, inflammable air is produced, though, according to the new theory, no water is concerned. According to this theory, finery cinder, called the oxyd of iron, consists of nothing besides iron and oxygen; and the charcoal, made with the greatest degree of heat that can be applied, is equally free from water; and yet when these two substances are mixed together, and exposed to heat, they yield inflammable air in the greatest abundance.

"This fact I cannot account for on the principles of the new theory; but nothing is easier on those of the old. For the finery cinder containing water as one of its component parts, gives it out to any substance from which it can receive phlogiston in return. The water, therefore, from the finery cinder uniting with the charcoal, makes the inflammable-air, at the same time that part of the phlogiston from the charcoal contributes to revive the iron. Inflammable air, of the very same kind, is procured when steam is made to pass over red-hot charcoal.

"Since inflammable air, and in great quantity, is procured in this process, the antiphlogistians are under a necessity of finding water, by the decomposition of which, and in no other way, they say it is made; and some of them find it in the charcoal, and others in the finery cinder.

"As Dr. Woodhouse repeated this experiment with peculiar exactness, I shall copy his account of it from the Philosophical Transactions of Philadelphia, vol. iv. p. 404: 'An ounce of 'the scales of iron, and the same quantity of charcoal, were 'reduced to a very fine powder, and exposed separately in co-'vered crucibles in an air furnace well supplied with fuel, for 'five hours. They were then taken out of the fire, and mixed, 'while red-hot, in a red-hot iron mortar, were triturated with 'a red-hot pestle, formed of an iron ramrod, were poured upon 'a red-hot sheet of iron, and instantly put into a red-hot gun-

 'barrel,

'barrel, which was fixed in one of Lewis's black-lead furnaces, 'and which communicated with the worm of a refrigeratory, 'a part of a hydropneumatic apparatus. Immediately after 'luting one end of the gun-barrel to the worm, 142 ounce 'measures of inflammable air came over in torrents, mixed 'with one tenth part of carbonic acid gas."

"Nothing more could have been done to exclude all water from each of the substances previous to their mixture; and yet we immediately find the effects of water, as much as if water itself had been employed instead of the finery cinder, which, no doubt, contained it. This experiment I should have expected might have converted the ingenious author of it himself. His explanation of it, however, is so unsatisfactory, that I cannot help thinking the consideration of it will go a great way towards the conversion of others. For he admits that there really is *water*, and in this great quantity, in the finery cinder.

"But if we suppose finery cinder to contain water, and so much of it as is necessary to form all the air that is produced in this process, both fixed and inflammable, we must, surely, abandon the most fundamental principle of the new theory, which absolutely requires water to be decomposed in passing over hot iron, the oxygen alone remaining in the iron, and the hydrogen escaping in the form of inflammable air; and it is only by comparing the addition of weight acquired by the iron in this case, that the proportion between the oxygen and the hydrogen in the composition of water is ascertained. Besides, how can it be supposed that water should both be decomposed, and not decomposed, in the same circumstances?"

The Doctor regards this as an *experimentum crucis*, and observes, that, when he first made it, Mr. Watt said it was one that the antiphlogistians could never reconcile to their hypothesis; "and the more I consider it, and the objections that have been made to it, the more reason I see to be of his opinion."

This fact, as here related, we must confess, staggered us not a little at first; the objections which have been brought against it by Berthollet, Fourcroy, and others, being by no means satisfactory: and it must be allowed, that if a large quantity of *hydrogen gas* could be procured by the method here described, it could not be explained by the antiphlogistians, but would most undoubtedly "go a great way towards their conversion." Nothing, however, is more dangerous in any department of science, than to take any thing as a truth, without

out having ascertained it to be such by experiment. The air which is thus procured from a mixture of dry finery cinder and charcoal, is inflammable; it takes fire on being ignited in contact with common air; but from this it by no means follows that it should be hydrogen gas. In a very ingenious paper inserted in the 50th N° of Nicholson's Journal, Mr. Cruickshank has proved that this air is a gaseous oxyd of carbon. On perusing the work which is now the subject of our analysis, he was struck with some of the experiments related in it, more especially with the quantity and nature of the gases obtained in the manner we have described; and although he had no doubt of the accuracy of these experiments, yet he was determined to repeat and extend them, and attend particularly to the nature of the different gases obtained. On repeating the experiment not only with the oxyd of iron, but with that of zinc, and some other metals, he was led to the following conclusions: 1st, That all metallic oxyds, capable of enduring a red heat, will, when mixed with charcoal, not only yield carbonic acid, but also a large quantity of inflammable gas; 2d, That those oxyds which retain their oxygen most obstinately, yield the greatest quantity of inflammable gas, while those which part with it readily, afford the greatest portion of carbonic acid; this acid being chiefly disengaged at the beginning of the process, and the purest and greatest quantity of inflammable gas, at the conclusion of it.

The specific gravity of this gas was found to be but little less than common air, being to the latter as 22 to 23; a circumstance which proved it to be different from the common hydrocarbonates, all of which are much lighter than common air, and still more different from hydrogen gas, which is more than twelve times lighter than the air of the atmosphere.

On mixing this gas with oxygen, and firing the mixture by the electric spark, Mr. C. found that 8 ounce measures required $3\frac{1}{2}$ of pure oxygen to saturate them, and when combined they produced 6 measures of carbonic acid gas, and but little water.

The chief circumstance which distinguishes this gas from other inflammable gases, is the great quantity of carbonic acid which it yields when combined with oxygen. Six measures of carbonic acid gas are formed, which would require, at least, seven measures of pure oxygen; whereas the quantity employed was only $3\frac{1}{2}$ measures; we must therefore infer, that the remaining $3\frac{1}{2}$ measures were originally combined in the inflammable gas, constituting an oxyd of carbon; and that this

this gas bears the same relation to carbonic acid, that nitrous gas does to the nitrous acid.

The gases obtained from other metallic oxyds and charcoal were perfectly similar in their properties; in all cases the metals were reduced; and the gases, on being mixed with common air, and ignited, burned with a lambent flame, without any sensible explosion, the product of combustion being a large quantity of carbonic acid, with a little water. When mixed with nitrous gas, no sensible change could be perceived, which proves that their oxygen is in a combined state.

"That finery cinder contains nothing but water, appears," Dr. Priestley says, "not only from its enabling charcoal to give out air exactly as water would do, but from its doing the same with respect to terra ponderosa aërata, which also gives out air by means of water, but not without.

"I mixed a quantity of this substance, reduced to a powder, with pounded finery cinder; and in a gun-barrel, heated red-hot, I got from it fixed air as copiously as if steam had passed over it. There was a considerable residuum of inflammable air from the iron."

This experiment was repeated by Mr. Cruickshank with the same result, but the conclusion which he draws from it is very different. Conceiving that the gaseous oxyd of carbon must proceed from the partial decomposition of the carbonic acid by the iron, when raised to a high temperature, he expected to succeed better by employing iron filings in place of finery cinder, as these would have a greater affinity for oxygen; and he accordingly found, that a much greater portion of gaseous oxyd was obtained when iron filings were employed in place of finery cinder; which proves that it is the carbonic acid which is decomposed by the iron.

Upon the whole, we consider the objections advanced by Dr. Priestley to the new system of chemistry, on this head, sufficiently refuted by the experiments of Mr. Cruickshank: these gaseous oxyds are very different from what the Doctor conceived them to be; and the presence of water is by no means necessary to their production. Instead of considering these experiments as decisive against the new theory, they appear strongly to support it; Mr. C. has, therefore, not only driven Dr. P. from one of his strongest remaining posts, but has taken possession of it for the antiphlogistians. Whether the positions to which he is obliged to retreat, be tenable, we shall endeavour to examine in our next Number.

ART. II. *Analytical Essays towards promoting the chemical Knowledge of mineral Substances.* By MARTIN HENRY KLAPROTH, Professor of Chemistry, Assessor to the Royal College of Physicians, Member of the Royal Academy of Sciences at Berlin, and various other learned Societies. Translated from the German. Octavo. 591 pages. CADELL and DAVIES, London. 1801. Price 10*s*. 6*d*.

THE abilities of Klaproth as a chemist and mineralogist are so well known, that we have no doubt our readers will be glad to see this work in an English dress. This volume contains a collection of the author's mineralogico-chemical essays, dispersed in various books and journals, and which, he informs us, in his Preface, it has long been his design to collect and publish, together with some new researches; but want of time, and other impediments, prevented him from accomplishing it sooner.

The German publication consists of two volumes, which the translator has given in one. Of the twenty-six treatises contained in the first volume, the greater part, the author informs us, is here published for the first time

"Each of them," he observes, "being unconnected with the others, I followed no particular order with them; and I also disregarded the order of publication, with respect to those that were before published separately. In my operations with the genus of silver ores, I intended, for the farther advancement of the systematical part of oryctognosy, to subject to analytical examination, not only particular species and varieties, but entire genuses, [genera,] with their chief species. But I was soon convinced, that the execution of this design was impracticable, both on account of the few leisure hours which I could command, and as, in general, it surpasses the powers of an individual.

"Having merely in view the progress of natural science, founded on pure experience, that is to say, on plain facts, free from all hypothesis, I entertain, on presenting these labours to the public, the most ardent desire of seeing the words of Bergman, 'Aliorum tentamina, presertim cardinalia, candide 'sunt revidenda,' put into practice; for, as this philosophical chemist very properly adds: 'Plus vident oculi, quam oculus; 'ideoque, quæ nova exhibentur, pluribus testibus in diversis 'locis utiliter confirmari puto.'—Being thoroughly convinced of my own fallibility, I recommend this examination with the greater eagerness, since the results of several of my experiments,

periments, respecting the constituent parts of fossils, are, frequently, in striking contradiction to those given by others. Thus the mineralogical world may be informed, on which side truth stands, or the least error occurs; and the oryctologist may, with greater certainty than before could be done, apply the data given him to the perfection of his art. On my part, I shall always receive with pleasure any well-grounded correction of my labours, and better information."

Circumstances seemingly indifferent, often produce, in chemical experiments, as well as in other investigations, unexpected consequences; of this every practical chemist must be convinced, and, as Mr. K. observes, may be proved by comparing his former with his latter analytical experiments, made with the *adamantine spar* and *circon* (jargon of Ceylon). "Who, for example," says he, "would have imagined, that the application of caustic alkali in the liquid state should so exceedingly facilitate the opening of hard stony matter, and remove the greatest part of the difficulties with which I had to struggle, when employing the same separating medium in the dry state?"

As many persons think that the preparation of a perfectly pure caustic lye is subject to more difficulties than it really is, we shall subjoin the author's method of preparing it. "I boil equal parts of purified salt of tartar, (carbonat of potash, or vegetable alkali prepared from tartar,) and Carrara marble, burnt to lime, with a sufficient quantity of water, in a polished iron kettle; I strain the lye through clean linen, and, though yet turbid, reduce it by boiling, till it contain about one half of its weight of caustic alkali; after which I pass it once more through a linen cloth, and set it by in a glass bottle. After some days, when the lye has become clear of itself, by standing, I carefully pour it off from the sediment into another bottle. To convince myself of its purity, I saturate part of it with muriatic or nitric acid, evaporate it to dryness, and re-dissolve it in water. If it be pure, no turbidness will take place in the solution. The quantity of caustic alkali, which this lye contains, I ascertain by evaporating a certain weighed portion of the lye to dryness, in an evaporating dish of a known weight. I also take care, in the preparation of this caustic lye, that the alkali be not entirely deprived of carbonic acid; because, in that case, I can, with greater certainty, depend on the total absence of dissolved calcareous earth. By employing burnt marble, or, in its stead, burnt oyster-shells, I avoid the usual contamination of the caustic

lye

lye by aluminous earth; because lime, prepared from the common species of limestone, is seldom enti ely free from argil."

With respect to the second volume, Mr. K. observes, that the numbers of the Essays proceed in a continued series with those of the preceding; a few of them have been printed in various publications, and are now collected; the others are entirely new, and published for the first time.

Though, for the most part, the author has followed the new chemical nomenclature, he has not scrupulously confined himself to its terms; but has, as he informs us, for the sake of brevity, now and then used the denominations, *Glauber's salt*, *common salt*, *horn-silver*, *blood-lye*, &c.; as also the term *mild*, instead of *carbonated*, in opposition to caustic. The translator *, however, has generally preferred the new nomenclature, but has frequently added the former denominations.

The following are the contents of the first part of this very interesting work:—1. Experiments concerning the Habitudes of various Stones and Earths in the Heat of a porcelaine Furnace—2. Analysis of the black-gray Flint—3. Experiments on the adamantine Spar—4. Examination of oriental Sapphire—5. Examination of Cat's Eye—6. Analysis of Chrysoberyl—7. Examination of Chrysolite—8. Examination of Olivin—9. Examination of various Silver Ores—10. Examination of the oriental Lapis Lazuli—11. Examination of the smalt-blue Fossil, from Vorau in Austria—12. Examination of the Jargon of Ceylon—13. Examination of the Hyacinth—14. Examination of the supposed Hungarian red Shörl—15. Examination of a new Fossil, from Passau—16. Examination of the supposed molybdenous Silver—17. Examination of the native Alumine from Schemnitz—18. Chemical Researches into Strontianite compared with Witherite—19. Examination of Lepidolite—20. Examination of Cimolite—21. Examination of the magnesian Spar—22. Examination of the supposed Muriacite—23. Examination of the native Alum, from Miseno—24. Examination of native Nitre, from Molfetta—25. Examination of the mineral Springs at Carlsbad in Bohemia—26. Examination of the saline Springs at Königsborn, and their Products.

Those only who have been accustomed to the tedious and

* Dr. Gruber, to whom the public are indebted for the translation of Gren's Principles of modern Chemistry; for an account of which see the fourth volume of our Review.

often perplexing processes of chemical analysis, and the length of time frequently consumed by the most expert chemists in the analysis of one substance only, can form any idea of the labour which the above enumerated examinations must have cost their accurate and industrious author. The Second Part contains no less than forty-six different examinations, an analysis of which we shall give in a future Number; in the present, we shall proceed to give some account of the contents of the First Part.

In the first Essay, Professor K. has given us the results of a great number of experiments on the habitudes of various species of stones and earths, in the fire of a porcelain furnace. To be enabled to draw just conclusions from experiments of this kind, it is necessary that they should be all performed with the most equal degree of heat. This advantage was afforded to our author by the furnaces of the Royal Porcelain Manufacture at Berlin, into which the fossils, ready prepared for trial, were put, together with the porcelain subjected to final baking.

Excepting Mr. Gerhard, our author seems to have been the first who has paid due attention to the nature of the vessels containing the subjects of the experiments; he always exposed specimens of the same mineral in a crucible of charcoal as well as of clay; for experiments in charcoal crucibles, a cavity was made in a thick fragment of well-burned charcoal, of a volume answering to the size of the fossil. This being put in, the cavity was closed with a charcoal stopper; after which the charcoal crucible was fitted into another crucible made of baked clay, and the cover of this last well secured by luting. For the comparative experiments, he placed another quantity of each fossil immediately in a crucible made of clay unmixed with iron; after the cover had been luted on, it was exposed to the same intensity of heat.

We shall not attempt to give the result of each experiment, as that would be to copy the Essay; for though each must have consumed much time, they are described with the utmost possible brevity. To shew the utility of these experiments, it will be sufficient to transcribe the author's general remarks on them.

"On reviewing the division of stones and earths into fusible and infusible, which has been hitherto adopted, we observe that several of them are classed among the first; which, however, are not fusible of their own accord, but acquire that property only by the co-operation of extraneous causes. Thus, if we observe

observe the Strontianite, (No. 91,) the Compound-spar, (No. 16,) Sidero-calcite, (No. 20,) Marble, (No. 56,) and in general all the species of calcareous earth, to vitrify in the melting-vessels, it is owing to the argillaceous earth of the clay-crucible, which by its contact effects the fusion of those stony matters, which, when alone, are infusible.

"With respect to many other substances, the cause of their vitrification is their ferruginous contents; for oxyd of iron likewise promotes the fusion of many compositions, otherwise not vitrifiable. This vitrification, therefore, cannot take place in charcoal-crucibles; because in these, the calx of iron loses its vitrescent property, by being reduced to reguline iron, and hence is rendered incapable of continuing in chemical solution or combination with unmetallic earths. It then separates from them by a kind of eliquation.

"An instance of this is afforded by the Basalt, (No. 6—10,) usually represented as a body, which very easily melts into a black glass. But this fusibility of basalt obtains only when its ferruginous part finds no opportunity to be reduced and to separate: for after this is withdrawn, the remaining portion of basalt is no longer vitrifiable. It now appears, if examined by a lens, as a body almost wholly corroded; and it is not converted into a scoria, unless after continued exposure to the most violent fire.

"It is worth remarking, that, in the charcoal-crucible, not only is the iron of such fossils as contain it in a very slight quantity, as Pumice-stone, (No. 15,) Boracite, (No. 19,) Mica, (No. 38,) completely reduced; but also, that even some species of stones, which in no manner undergo real fusion, nay, which hardly seem to become softer, as the Ligniform Asbestus, (No. 11,) Chrysolite, (No. 25,) Brown-red Semi-opal, (No. 65,) Prase, (No. 72,) and Serpentine, (No. 80,) do nevertheless deposite, as it were by exsudation, most part of their iron.

"The proportion of the ferruginous contents thus discovered may serve at the same time to determine in dubious cases the classification in the mineralogical system. That is to say, it may assist to decide, whether a fossil, whose proportion of metallic parts is as yet unknown, should obtain a place in the class of earths and stones; or, whether it ought to be ranged in the genus of iron ores.—Such is the case with umber. Of one hundred parts of umber from Cyprus, (No. 102,) there remained 67; and the iron, reduced from this residuum, amounted to 37; but the vitreous scoria, only to 30.—Of one

hundred parts of umber from Cologne, there likewise remained 67, of which 35 were iron, and 33 were scoria. This mineral, therefore, as much deserves a place under the genus of iron ores, as several other iron ores, less rich in ferruginous contents. It may be considered, either as a particular species of the brown iron-stone; or as a variety of brown iron-ochre."

Trials made by fire may, probably, likewise be of some use with respect to those fossils, concerning which the opinions of the learned are yet divided, with regard to the means employed by nature for their formation. In this branch of geological researches, the experiments made by means of fire are certainly more decisive than the analysis in the moist way. Though the author observes, that it is quite contrary to his intention to enter into this dispute, yet he thinks himself obliged to state his own private opinion respecting this subject, which is, "that I cannot rank among the products of fire, either the genuine basalt, or its kindred wacke, or the porphyric state. In this persuasion I am confirmed by personal inspection of basaltic districts, especially of the Bohemian middle mountains; as well as by the habitudes of the above minerals in fire.

"On the contrary, as to what relates to the generation of the Obsidian, (No. 58, 60,) Pumice-stone, (No. 15,) and pretended Volcanic Zeolite, (No. 111, which last is reckoned by some among the Pitch-stones,) &c. I willingly renounce my own opinion; adding only, that, on considering the arguments for and against their volcanic origin, the circumstance of the obsidian and pumice-stone giving in fire exactly the same products, should not be disregarded; and also, that both these fossils not only accompany each other at Lipari, but likewise frequently occur actually blended."

Though the author does not appear acquainted with the experiments of Sir James Hall, inserted in the Edinburgh Transactions, which seem strongly to support the igneous origin of basaltes, and some other similar fossils, we are glad to find that he steers a middle course between the neptunists and volcanists, which is the only safe one, as no doubt can remain in the minds of those who have carefully examined the surface of this globe, that sometimes fire and sometimes water have been concerned in their formation and arrangement.

We agree, however, with our author, that inferences drawn from experiments by fire should not be carried too far; nor should a decisive conclusion be made on the constituent parts

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of a fossil, merely from its changes in the fire. For in this respect, the analysis in the humid way is the only safe guide.

The second Essay contains an analysis of common flint, which the author was induced to make, that he might more readily discover whence arises the addition of weight which some minerals acquire when triturated in a flint mortar with an appropriated mullar of the same. He found that stones, the hardness of which does not surpass that of flint, weigh no more after trituration than before; but such as are harder acquire an increase of weight, which, in some gems, as in the sapphire, adamantine spar, and chrysoberyl, often amounts to from 10 to 1[illegible] *per cent.*

As this additional weight must of course be subtracted from the sum of the constituent parts of the decomposed body, an exact chemical knowledge of the substance, of which the grinding vessel consists, is indispensable; and common flint would be little eligible for the grinding of hard stones, if, besides the silex, its chief ingredient, it contained other earths in the quantity stated by mineralogists, and of which alumine has been said to make up from eighteen to twenty parts in the hundred.

One hundred parts of flint, according to our author, contain 98 parts of silex; 0,50 of lime; 0,20 of alumine; 0,25 of oxyd of iron, while one part seemed to have been volatilized in the fire.

From this analysis it would appear, that the quantity of foreign earths combined with the silex only amounts to about one grain. On this account, and considering the small number of grains abraded from a flint mortar, the author justly considers it as a superfluous nicety to bring into calculation the small fractional parts of the other earths, besides the siliceous.

The next Essay is on the analysis of *adamantine spar*, and affords an excellent specimen of the address of our author in this species of research. The native places of this stone are China and Bengal; and from each of these countries it was first brought to Europe for the celebrated cabinet of Charles Francis Greville, Esq. in London. The denomination of *adamantine spar*, given to it by the naturalists of this country, is grounded, our author observes, not only on its uncommon hardness, which is almost equal to that of the diamond, but also in its application; for the Chinese and Indian lapidaries make use of the powder of this stone, instead of the real diamond powder, for grinding.

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The Chinese adamantine spar contains a quantity of magnetic iron disseminated through its substance, which, however, is to be considered merely as a foreign substance mingled with it, and therefore cannot be regarded as a constituent part. This being subtracted from one hundred parts of the spar, the remainder, according to Professor K.'s analysis, consists of 84 parts of alumine, 7,50 of oxyd of iron, and 6,50 of silex. The Bengal spar consists of 89,50 of alumine, 1,25 of oxyd of iron, and 5,50 of silex; the remainder of the hundred being magnetic iron.

"The very predominant proportion of the aluminous over the siliceous earth, exhibited by this decomposition of both varieties of the adamantine spar, affords," the author observes, "a new proof that alumine is susceptible of a greater cohesive power than silex is possessed of. Hence nature may form stones of extreme hardness almost entirely from aluminous earth; of which my analysis of the sapphire will give, in the sequel, a very striking instance. On the contrary, it is evident that this does not hold good with respect to the siliceous earth, as appears from rock-crystal, its purest form; for, how inferior is this last in hardness to the sapphire, as well as to the adamantine spar!"

In the fourth Essay, our author gives an analysis of the oriental sapphire, the result of which is so widely different from that given by Bergman, that we cannot help suspecting very different minerals have been made the subjects of experiments by these accurate chemists. According to Bergman, one hundred parts of sapphire consist of 35 parts of silex, 58 of alumine, 5 of lime, and 2 of iron. Klaproth has discovered the following substances and proportions; alumine 98,50, oxyd of iron 1, lime 0,50. From this, if we subtract the unimportant, and, perhaps, only casual portion of calcareous earth, as well as the slight quantity of ferruginous matter, we shall find that the sapphire is little else than a simple aggregate of pure aluminous earth.

"But what a high degree of cohesive power," the author observes, "and most intimate chemical combination, must nature be able to command, in order to be capable of transforming such a common substance as the aluminous earth, into a body, so eminently distinguished and ennobled, as we find the sapphire to be, by its hardness, density, brilliancy, and resistance to the actions of acids and fire, as well as to natural decay in the course of all-consuming time!—It is, therefore, not the identity, or precise sameness of the constituent

stituent parts alone, but also the peculiar nature of their chemical combination, which constitutes the metaphysical essence of the products formed from them by nature."

These experiments and observations of Klaproth would seem to afford some countenance to the opinion of Professor Lampadius, who, we are informed, is at present engaged in experiments to ascertain the nature of siliceous earth, which he conceives to be nothing but argillaceous earth in the highest degree of oxydation, and which is changed into argillaceous earth by treating it with deoxydant substances. It seems, therefore, not unlikely, that several fossils, which, according to their external signs, appear to be siliceous, are changed in the hands of the chemist into argillaceous earth. In confirmation of this opinion, Lampadius observes, that in different analyses of the same substance, he has sometimes obtained a greater, sometimes a less quantity of argillaceous and siliceous earths.

May we not account for the different results of Bergman's and Klaproth's analysis of sapphire, from the different modes in which they were conducted, on this supposition?

In the sixth Essay, Mr. Klaproth gives an analysis of the chrysoberyl of Werner, which consists of 71,50 parts of alumine, 6 of lime, 1,50 of oxyd of iron, 18 of silex. From the experiments detailed in the next Essay it appears, that the chrysolyte of Werner is composed of 43,50 parts of magnesia, 39 of silex, and 19 of oxyd of iron. From comparing these analyses, it will be evident how greatly the respective constituent parts of chrysoberyl and chrysolite differ, and consequently how necessary it is to separate them from each other in a systematical arrangement of gems.

The eighth Essay contains the analysis of olivin, which was formerly considered as a subordinate species, or rather variety of chrysolite, and known by the name of "basaltic chrysolite." Werner, however, has thought proper, in his system, to separate these two substances, but, we think, without sufficient grounds, as will appear when we consider the component parts of olivin, which, according to our author, is composed of 52 parts of silex, 37,75 parts of magnesia, 10,75 of oxyd of iron, and 0,12 of lime.

"From these results," adds our author, "it is plain that the olivin and chrysolite are very nearly related to each other; and, as the constituent parts of each are so much the same, and their respective proportions not too dissimilar, it seems to me proper that these two stones should no longer be divided

divided into two different species; but that the difference, deduced from their external characters, can only justify the subdividing them into two varieties of one species. Moreover, since no greater difference appears to take place between them, than, perhaps, that by which the basaltic horn-blende is distinguished from the common, it follows, that the olivin might be entitled to claim its former denomination of basaltic chrysolite."

The ninth Essay occupies no less than fifty-three pages, and contains a great number of interesting facts concerning the analysis of various silver ores, which reflect the highest credit on the industry and ingenuity of the author. His first experiments are on the native horn-silver, or corneous silver ore, called by Kirwan, vitriolico-muriated silver ore, which is remarkable among the rarer ores of silver, not only from its richness, but also from the substance by which Nature has mineralized that noble metal.

One hundred parts of the corneous silver ore, from the larger specimen in the Electoral collection at Dresden, were found to contain, of silver 67,75; muriatic acid 21; oxyd of iron, 6; argil 1,75; sulphuric acid 0,25.

One hundred parts of the corneous silver ore, found in the Schlangenberge, afforded by analysis 24,64 parts of silver; 8,28 of muriatic acid; and 67,08 of argil, with a slight trace of copper.

It is owing to the argil contained in this ore, that it does not assume the same appearance when heated on charcoal as the common luna cornea, but that the metal transudes in the reguline state in small globules; for as that earth deprives the muriated silver of its acid when heated, the silver is enabled to assume its metallic state.

As silver, notwithstanding its great affinity with muriatic acid, enters into no combination with it while in the perfect reguline state; and since that metal, as far as we know, is never found in the bowels of the earth in an oxydated state, it is difficult to ascertain the operation of nature in producing the corneous silver ore. Bergman imagined that Woulfe had solved the difficulty, by asserting, that in the above-mentioned ore he had traced the sulphuric acid, besides the muriatic; for silver unites readily with sulphur: and since sulphurated silver not unfrequently undergoes a decomposition, the sulphur passing over into the state of free acid, and forming sulphure of silver: if now muriatic acid interferes, it will, by

reason of its greater affinity for silver, decompose the sulphate and form the corneous ore.

The author next examines the red silver ore, (rothgultigerz,) which is commonly subdivided into two species, the *light* and *deep red*. The latter is generally opake, while the former is in a greater or less degree transparent. It has been a common opinion, that the silver in this ore is mineralized by arsenic as well as sulphur. Among the celebrated chemists who have asserted this, may be named Bergman, Cronstedt, Henckel, and Walerius; yet upon the whole, it will, we believe, be found, that arsenic is by no means so general a mineralizer as has been supposed. This has been pointed out by Monnet, in his answer to the prize question of the Royal Academy of Sciences at Berlin, and is confirmed by our author's analyses of these ores; according to which, one hundred parts of the deep red silver ore contain 60 of silver, 20,3 of reguline antimony, 11,7 of sulphur, and 8 of concrete sulphuric acid. The same quantity of the bright red crystalline ore from Churprinz Friedrich August, near Frieberg, afforded 62 of silver, 18,5 of reguline antimony, 11 of sulphur, and 8,5 of concrete sulphuric acid. In these red silver ores no vestige of arsenic could be found, though this metal constantly accompanies the ores.

In this account of the red silver ore, the author observes, that though he has mentioned sulphur and sulphuric acid as two particular products, yet he does not mean to say by this, "that they are two separate and really distinct constituent parts, actually existing in the ore. It is rather more probable, from the nature of the subject, to suppose, that in the undecompounded ore, both together constitute only one homogeneous ingredient part, and that the oxygen, by which the sulphuric acid was generated in this process, had before been uniformly diffused over the whole mass of the sulphur. But, if so, there is no doubt, but that the red colour of the ore, which in general is erroneously ascribed to some arsenical matter, depends on that state of sulphur in its first degree of oxygenation, which by some is rightly called oxyd of sulphur. On this account, the silver, antimony, sulphur, and oxygen, are, in the strict sense, the genuine constituent parts of the red silver ore, taken in its natural state."

The vitreous silver ores (silberglangerz) are next examined, and found to contain 85 parts of silver and 15 of sulphur in the hundred. Of these sulphurets of silver, which are the richest of all the silver ores, various analyses have been given, in which the proportions of their constituent parts have been stated

stated very differently. Bergman states the portion of silver to be only 75 parts and sulphur 25; Brunnich, 90 parts in the hundred; Sage, 84 parts of silver and 16 of sulphur, which nearly agrees with our author's analysis.

The white silver ores (weissgultigerz) next claim the author's attention; and he begins with observing, that Nature has not confined herself to one certain determined law, in fixing the proportions that obtain among the constituent parts of the white silver ores. It is owing to this difference in the proportions of its component principles, that they are found, at one time bright, and of a light gray; at another, of a lead gray, and only glittering; of a fracture compact, and even sometimes finely grained, or even passing into the fibrous texture. Hitherto they have only been met with in small lumps among other ores. Our author's analyses of the different species of white silver ore, each of which he describes at length, shew that the component parts are silver, lead, antimony, iron, sulphur, alumine, and silex.

"Though these ores are usually accompanied by galena, the lead found in them should not, on this account, be considered as accidental; since it there exists in intimate mixture. It is a particular and remarkable phenomenon, and an anomaly in our knowledge of the elective attractions of bodies, that, even in the repeated digestions of the ore, neither the strong nor dilute nitric acid is capable to dissolve the whole of the admixed lead, and to destroy its combination with the antimonial ingredient."

The gray silver ores (grangultigerz) are next examined, and shewn to consist of silver, copper, reguline antimony, iron, sulphur, and alumine.

Besides the sulphurated ores of silver, various other metallic mixtures are found in the mineral kingdom, into which the silver, unaccompanied by sulphur, enters as a constituent part. To these belongs the native amalgam, which occurs chiefly in the quicksilver mines, and in various forms in the dutchy of Deuxponts. One hundred parts of this substance afforded our author 36 parts of silver and 64 of mercury.

Another example of a metallic mixture, containing silver free from sulphur, is the native arsenical silver. From the richer sorts of this ore our author selected a specimen, which was dug up from the mine Samson at Andreasberg, the analysis of which gave 12,75 parts of silver, 44,25 of iron, 35 of arsenic, and 4 of reguline antimony.

Besides the above species of silver ores, the analyses of which have

have been made the subject of this essay, our author observes, that other kinds of argentiferous ores occur. "But the greatest part of these cannot be fairly considered as species of the genus of silver ores; because the proportion of the noble metal which they contain is too inconsiderable, when compared with their other constituent parts.

"In general, I should not wish to recommend the method hitherto used in the systematic arrangement, of denominating ores by the constituent part, which is of the greatest mercantile value; though, on the other hand, I do not venture to assert, that, at the present period, the predominant constituent part alone should serve as the principle, upon which to establish the classification of fossil bodies. If it were so, we should only retain under the genus of silver (besides the native silver) the corneous, the red, the vitreous, and brittle vitreous silver ores; together with the black silver ore (silver-mulm), which I had no opportunity to examine. And, on the contrary, the white silver ore would then necessarily come under the genus of lead; the gray under that of antimony; the silver amalgam under that of mercury; and the arsenical silver under the genus of iron.

"It is only by increasing our knowledge of the chemical composition of individual species of fossils that we shall be able to erect, on the relics of the present system of mineralogy, another, which shall possess a more solid foundation, and shall be more conformable to nature."

In the tenth Essay, we have an analysis of the *Oriental lapis lazuli*, one hundred parts of which appear to contain 46 of silex, 14,50 of alumine, 28 of carbonate of lime, 6,50 of sulphate of lime, 3 of oxyd of iron, and 2 of water. Though the researches of Marggraf have refuted the opinion formerly received, that the blue colour of this mineral substance originated from an admixture of copper; and though it has been demonstrated that it is owing only to iron, yet our author does not say in what peculiar state this metal exists to produce this colour. In the Annales de Chimie, tom. xxxiv. Guyton has shewn, that it is derived from the blue sulphure of iron, the nature of which substance did not seem to be known, much less its existence in this fossil suspected by Klaproth at the time he published this Essay.

The next Essay contains an examination of the smalt blue fossil from Vorau, of which an account is inserted in the third volume of the Observations and Discoveries in Natural History. It was at first taken for native smalt, then for prussiate of iron,

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or Prussian blue; and lastly for mountain blue, or azure copper ore; but from our author's experiments, it does not appear to belong to any of these. As the colour is similar to that of lapis lazuli, and as it likewise contains iron, if lime had been a constituent part, he should not, he says, hesitate to range it as a variety of lapis lazuli. We have not had an opportunity of examining this fossil, but we think it not improbable that its colour, as well as that of lapis lazuli, may be produced by the blue sulphure of iron.

In the twelfth Essay our author presents us with the result of his experiments on the Jargon of Ceylon, in which he discovered a new earth, to which he gave the name of zircon earth *(terra criconia.)* Accounts of this discovery have been given in the English and French journals, and in the late elementary works on chemistry; we think it therefore, unnecessary particularly to describe his experiments, and shall content ourselves with giving the general result of the analysis: one hundred parts of jargon are composed of 31,50 of silex, 0,50 of oxyd of iron, and 68 of the new earth.

The analysis of the hyacinth is detailed in the next Essay, and our author's experiments lead to results so different from those of Bergman, that we should have suspected these chemists had operated on very different substances; but when we reflect that Mr. Klaproth discovered zircon in the hyacinth, with whose existence Bergman was unacquainted, we may in some degree account for the difference. According to Bergman's analysis, one hundred parts of hyacinth contain 40 of argil, 25 of silex, 20 of lime, and 13 of oxyd of iron; whereas, from the experiments of Klaproth, the same quantity contains 70 parts of zircon, 25 of silex, and 0,50 of oxyd of iron. Hence it would appear, that the jargon of Ceylon and the hyacinth should, in future, be ranked in the series of natural bodies, as two species of the same genus, or as two genera under one peculiar and distinct order of stones.

In the fourteenth Essay we are presented with the results of the chemical examination of the supposed Hungarian red shörl, which our author discovered to be a metallic oxyd; and as by several of its properties it appears that this metallic substance does not belong to any of those at present known, he thinks that it deserves to be reputed a new peculiar genus of metals. A copious brown-red precipitate, produced by the gallic acid, furnishes an easy test for distinguishing it from other metals.

The author concludes his examination of this substance by observing,

observing, that "whenever no new name can be found for a new fossil which indicates its peculiar and characteristic properties, (in which situation I find myself at present,) I think it best to choose such a denomination as means nothing of itself, and thus can give no rise to any erroneous ideas. In consequence of this, as I did in the case of the Uranium, I shall borrow the name from this metallic substance from mythology, and in particular from the Titans, the first sons of the earth. I therefore call this new metallic genus TITANIUM."

In his next Essay Mr. K. has given an account of his examination of the new fossil which was discovered by Professor Hunger, in the bishopric of Passau. One hundred parts of this mineral appear to contain 35 of silex, 33 of lime, and the same quantity of oxyd of titanium, with a slight trace of manganese.

The sixteenth Essay contains an examination of a metallic fossil, met with a few years ago at Deutsch-Pilsen in Hungary, and which has been described by Born as a new species of silver ore, under the name of *argent molybdique*, or molybdenous silver. The experiments of our author, however, shew that it contains neither silver nor molybdena, but is a sulphuret of bismuth, a hundred parts containing 95 of bismuth and 5 of sulphur.

"From this small portion of sulphur," Mr. K. observes, "it seems that the bismuth is but imperfectly mineralized; hence that ore nearly approaches to native bismuth. And probably on this circumstance depend its whiter colour, and brighter lustre, which so much resembles that of silver recently polished; and by which it is distinguished, in external character, from the sulphurated bismuth of Riddarhyttan, in Westmanland, which is more of a lead-gray colour."

In the seventeenth Essay an account is given of a native aluminous earth from Schemnitz; and in the eighteenth, some ingenious researches into the *strontianite* compared with *witherite*; the results of which prove, that though these species of earth seem to be nearly of the same nature, with respect to their relations to the sulphuric acid, as well as the force with which they retain the carbonic acid in the fire, many circumstances exist which indicate their essential difference. "These are principally, the less specific gravity of strontianite compared with that of witherite; the difference of the habitudes of the carbonic acid combined with both of them; the various form of the crystals produced by the combination of these earths with the nitric, acetic, and, above all, with the muriatic

 acid;

acid; the power of strontian earth to crystallize in simple water; and principally, also, the red colour, which the earth of strontian imparts to flame in various ways of preparation."

The author should not, however, have mentioned the power of strontian earth to crystallize in simple water as a distinctive characteristic; for we have obtained beautiful crystals from a solution of simple barytic earth in distilled water.

In our next Number we shall give an analysis of the remaining part of this valuable work, in which the author has done so acceptable a service to the science of mineralogy; and we cannot help observing with him, that our knowledge of mineral bodies would undoubtedly be much more extensive, and at the same time require much fewer corrections, if every newly discovered fossil were immediately put to the chemical test, and not received into the systematic arrangement, till it had been stamped with the authentic seal of truth.

ART. III. *Practical Observations on the Nature and Treatment of some exasperated Symptoms attending the venereal Disease.* By EDWARD GEOGHEGAN, Member of the Royal College of Surgeons; of the Royal Medical Society, Edinburgh; and Surgeon to the Dublin General Dispensary. Octavo, 75 pages. HUGHES, London. 1801. Price 3*s.*

THE treatment of the venereal disease, in its various forms and numerous anomalies, has deservedly gained a very large share of attention from medical writers and practitioners; but the difficulties attending this inquiry are such, that a considerable number of points still remain to be settled in the treatment even of some of the common symptoms of this malady.

The author of this little volume proposes to treat of some of the more aggravated symptoms, and particularly of phymosis, of which he properly observes, that "there is no symptom the event of which is more interesting, as it frequently terminates in mortification, and the loss of a part, or of the entire penis."

As a further motive for this inquiry he adds, "the number of instances of this kind, which occurred during the summer, autumn, and winter, of 1799, excited my astonishment; and on communciating with other practitioners, I found that they had met with similar cases in a much greater number than at any former period: as to the nature and treatment of it, there were

were a variety of opinions, in general different from those I had formed.

"It was noticed by the public that the venereal disease tehn raging appeared to be singularly malignant; and I have heard even professional men say, that they thought there was an increased degree of virulence in the infection. The appearances which gave rise to these remarks, were violent tumefactions of the penis, often terminating in gangrene, particularly when injudiciously treated; other symptoms were also observable, singular for intensity of degree. Although I was always decided in the opinion and practice I now maintain, yet the frequent instances within so limited a time, afforded opportunities for much observation, and led me to question the propriety of the practice generally pursued and recommended."

The main object of the author's inquiry in this volume is, whether, when the ordinary symptoms attending an infectious disease appear to be exasperated in an unusual degree, this is to be attributed to an increased acrimony in the poison, or to any adventitious or physical causes insensibly operating: and the solution of this question is of the utmost importance, since it is this which must direct the practice of the surgeon to one or other of two very opposite methods.

The author then proceeds to canvass Mr. John Hunter's opinions on this part of the subject, which are remarkable, as they shew the great uncertainty into which this acute observer and excellent practitioner was thrown by the numerous and perplexing cases which had fallen under his experienced eye. Mr. Hunter's words are these: "In those cases, where violent inflammation has attacked the seat of a chancre producing phymosis, as before described, and often so as to threaten mortification, a question naturally arises—Is mercury to be given freely, to get rid of the first cause? Nothing but experience can determine this. I should incline to believe, that it is necessary that mercury should be given; for I am afraid our powers to correct such a constitution, whilst the first cause subsists, are too weak: however, on the other hand, I believe the mercury should be given sparingly; for if it assists in disposing the constitution to such symptoms, we are gaining nothing, but may lose by its use: I therefore do suppose, that such medicines as may be thought necessary for the constitution, should be given liberally, as well as the specific. Bark is the medicine that probably will be of most general use: opium, in most cases of this kind, will also be of singu-

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lar service. The bark should be given in large quantities, and along with it mercury, whilst the virus is still supposed to exist; or if the inflammation has arisen early in the disease, they may then be given together, so as to counteract both diseases, and not to allow the inflammation to come to so great an height as it would otherwise do, if mercury was given at first alone. This inflammation may be so great in many cases, or be so predominant, that mercury may increase the disposition, and therefore become hurtful. Where this may be supposed to be the case, bark must be given alone."

Mr. Geoghegan very clearly points out the contradictory indications which are deduced from these "equivocal and inconsistent opinions;" for, in a case where mortification is threatened from this cause, and therefore where the necessity for decided and vigorous practice is extremely urgent, "the surgeon who gives mercury, and he who does not, are alike sanctioned by this authority."

Mr. G. then proceeds to the inquiry, whether the increased acrimony of the poison has any share in producing those aggravated symptoms. The opinion of increased acrimony in these cases he would entirely reject, from the following arguments: "When the virus is applied to a non-secreting surface, ulceration is generally the consequence; and although attended with some degree of inflammation, yet it is rather circumscribed, and the ulcerative process goes on more rapidly than the inflammatory, and the latter is often totally wanting. Females having the slightest appearances, without even ulceration or any inflammatory symptom, indeed, ignorant of being infected, constantly communicate the disease, and the persons receiving it are variously affected; in one man it will exhibit the most trivial, in another the most dreadful appearances, and both infected by the same woman, at nearly the same time. Taken into the stomach, it produces no effect; and even proves harmless, when applied to the surface of many persons: it also remains in the constitution for years, without manifesting itself, or exciting the least disturbance. In the small-pox, we every day see the mildest and most malignant kind, and both produced from the same infection. These facts establish the principle most unequivocally, that mild or violent symptoms, whether attended with inflammation or ulceration, or in whatever form they appear, are not characteristic of variety in the matter of infection; hence, we cannot account for aggravated symptoms, from the nature of the poison."

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This hypothesis of increased acrimony being rejected, an explanation of the varieties in the degree of virulence is to be sought for in a peculiarity of the constitution; and the author, in admitting this to be the true cause, very pointedly adds, "I cannot but express my astonishment at the narrow view which is generally taken of this material point. One would think, from the plans of cure laid down and usually pursued, that bad constitution meant some fixed and definite thing, for which there was a decided rule of treatment; not that fluctuating state of the animal machine which is liable to vary with every breeze."

Among the circumstances which influence the constitution, he enumerates "the constitution of the air, place of residence, disposing to diseases of different types, disposition to particular diseases, effects of the human passions, intemperance, exercise where rest is necessary, habits of life, also neglect of the local sore, or general habit, and many other causes interrupting the general health, which it is impossible to recount, and all of which have their share in exasperating diseases, and changing their form."

Mr. G. lays considerable stress on the epidemic constitution of the air, as having often a particular effect on the progress of inflammation; so that the same season which gives a tendency to catarrh, influenza, and catarrhal fever, will in some circumstances promote the progress of erysipelas, and cause it to assume its most formidable symptoms. This undoubted fact, which has been so well illustrated by Sydenham, Huxham, and others, the author applies with considerable force to explain the occasional frequency of the worst cases of phymosis and inflammation of the penis. He likewise adduces the authority of Mr. Henthorn, one of the surgeons to the Lock Hospital, that in the summer, autumn, and winter of 1799, a period remarkably wet, ungenial, and unfavourable to vegetation, "an extraordinary number of cases of exasperated symptoms presented at that Hospital, during this time; but that they put on the putrid type, particularly among females. Mortifications were very general, set in early, and often proved fatal." As the inflammation of the penis is admitted to be erysipelatous, and as erysipelas is a frequent attendant upon epidemic causes, this will shew the great connexion between the prevalency of these causes, and a concomitant frequency of severe and exasperated inflammation in this irritable organ.

After mentioning some cases in which an accidental or occasional application of an irritating substance, such as cor-

rosive sublimate, has produced a sudden increase of the inflammatory symptoms, followed by the worst consequences, the author notices the opinion of Mr. Benjamin Bell, in his valuable work on the Venereal Disease, concerning the phagedenic chancre, which this eminent writer thinks is occasionally owing to the matter of infection having been particularly virulent; and he concludes that it is so, from ulcers of this kind being more frequent at some times, than at others, and from observing them at the same time in different people receiving the infection from the same woman. As an instance of this latter circumstance, Mr. Bell mentions, that, "about two years before the publication of his work, he met with more instances of this phagedenic chancre, in the space of three or four months, than he had seen for several years before, and in four of them the infection was traced to the same woman."

This opinion which Mr. Bell advances, the author is at considerable pains to refute by the following reasoning: "arguments have been adduced already to prove that the degree of acrimony in the matter of infection is the same in every case: that it may be diluted, is certain; but still, if it is capable of irritating, it will produce the disease, which once produced, it will be regulated in its action by the scale of the constitution. The host of evidence founded on experiment in support of this, is so powerful and unequivocal, as to have by this time established the principle beyond all question. Giving Mr. B— the fullest credit for the accuracy of his statement, still I feel myself warranted in rejecting his conclusions, because I conceive, that the varieties he mentions are to be accounted for, in a way more consistent with the laws of nature and of acknowledged principles. One would be disposed to think, prima facie, that there was an inconsistency in the evidence brought forward in the support of Mr. B—'s character of the matter of infection. Why did he think it particularly virulent? because a certain number of men had violent symptoms, who had intercourse with the same woman; surely then, it was those violent symptoms which gave character to the matter: the woman consequently must have had similar symptoms; but if not, and if she had the disease in a mild form, it is fully sufficient to overthrow Mr. B—'s doctrine; for although I can conceive that the person communicating might have slight symptoms, and the person receiving the infection, the phagedenic ulcer, yet, with Mr. B—, variety in the matter is occasionally necessary to produce variety in the disease; and it is a fair inference from his reasoning, that phagedenic chancre was essential to the communication of phagedenic chancre.

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We know that females with such symptoms, could not admit of intercourse; and this woman, from the demand she seems to have been in, one would suppose, had rather the appearance of health than of disease."

Agreeably to the author's ideas of the aggravation of venereal symptoms by external causes, he is disposed to explain the cases mentioned by Mr. Bell, by attributing them to an epidemic constitution of the air acting upon irritable habits, rendered more so by disease, and perhaps by mercury; and he thinks it probable, that a further inquiry would have detected some other violent diseases at that time prevalent. He adds, in a note, that in the year in which this case is dated (1736,) an epidemic did rage through Scotland, and appeared in a variety of forms.

The general axioms and practical regulations to be deduced from the author's view of the subject, he lays down in the following clear and precise words; in which, however, the reader will discover an entire acknowledgment of the truth of the well-known positions which were advanced by John Hunter, and constantly kept in view by him in all his writings; which are, that the immediate cause of the symptoms usually termed venereal is an action *sui generis*; and in this case, therefore, a diseased action: and also that two diseased actions cannot exist at the same time in the same parts. Mr. G.'s words are the following: "if the opinions which have been advanced in the course of those pages are well founded, it will appear, that the wide range of medical science is necessarily involved in the consideration of the phenomena of the venereal disease; and that, in conducting the treatment, it is merely necessary to apply the common rules of practice with minute attention. The general practice of commencing with mercury, the moment phymosis appears, or even chancres, is often productive of the greatest mischief; not only the general constitution, but its particular state at the instant, ought to be weighed maturely. We every day see mercury prove noxious in venereal cases instead of medicinal, and in the same subject, for the same complaint. At another period, it will prove successful. This fact evinces, that mercury, although a certain antidote to the disease, requires a certain state of constitution to exist, that it may produce medicinal effects. What that state is, it may not be easy to explain: it would occur to me to be necessary, that the venereal irritation should be paramount; for, I can conceive, that if what is termed the phlogistic diathesis prevailed, which is constantly produced by cold, or the scrofula, and the venereal disease in the habit, that mercury

would not cure the latter, whilst the former remained active; hence, its injurious effects where venereal symptoms are attended with great inflammation, and the difficulty of curing scrofulous patients. The same rationale applies to other conditions of body prevailing in venereal cases, to which mercury is unfriendly. After the accessory disease has subsided, and that the venereal alone exists, then the mercurial irritation becomes salutary. With respect to the treatment of phymosis and phagedenic chancre, I would lay it down as an axiom, that the venereal action should not be held in view, but that they should be considered as accessory diseases; and in all cases, where an accessory disease takes place, it should be removed, previous to attempting the cure of the original. Where pneumonia, violent catarrh, or any other disease supervene, the mode of cure in such diseases would be pursued, but no mercury, until after they had been removed; yet it is but too generally the practice, when the local symptoms of the venereal disease appear aggravated, to attribute all to the poison, and, prima facie, to pour in the antidote from which the most dreadful consequences are arising every hour; in phymosis, immediate mortification; in chancre, a sloughing; and in both, the destruction of part, or of the entire penis."

It is highly worthy of the attention of every practitioner in this country, to be aware of the very striking difference in the treatment of many of these violent and dangerous symptoms, which is pursued in several foreign countries, and especially in France. The experience of a surgeon so highly and justly celebrated as Desault, cannot be treated slightly by any of the profession in any country; and it is very certain, as Mr. Geoghegan observes, that the British surgeons pursue the invigorating plan in numerous instances where the French employ evacuations. Without yielding the palm of superior skill to our foreign brethren, we may, without hesitation, subscribe to the opinion of the author of this treatise, that the indiscriminate administration of bark and wine, and other tonic remedies, has been productive of the greatest mischief; and that a wide difference may exist between that state which threatens mortification, and the actual existence of mortification; so that bark and wine in the former, in young subjects, or in those who have not suffered from previous disease, may be in general injurious.

The leading object of this treatise appears to be, to look for an explanation of several of the most formidable symptoms attending venereal ulceration of the genitals, and especially for

for the cause of an exacerbation of the common morbid appearances, in those predisposing and occasional causes of disease to which all persons are at times exposed; such as the state of the atmosphere, and the like.

In pursuance of this object, many forcible arguments are adduced; and the practical observations introduced are of the more value, as they are the result of much experience. The subject will certainly bear a much fuller investigation than is here given it, and we cannot but think the author's arguments in some parts weak and too far extended; especially in the explanation given of the cases related by Mr. Bell, and in his endeavours to prove that no difference of acrimony in the infecting virus does ever exist; but the candour and liberal spirit of inquiry which pervades this treatise, will render its perusal both interesting and instructive to the medical practitioner.

It is a necessary, though not an agreeable part of our office, to notice a considerable number of typographical errors, which, in so small a work, might, we think, have been avoided.

Art. IV. *Annals of Insanity; comprising a Variety of select Cases in the different Species of Insanity, Lunacy, or Madness, with the Modes of Practice, as adopted in the Treatment of each.* By William Perfect, M.D. of West Malling in Kent, and Member of the London Medical Society. Second Edition. Octavo. 412 pages. Murray and Highley, London. 1801. Price 8*s.* boards.

THE volume before us, though it is termed *Annals*, is the second edition of *Cases of Insanity*, published a few years ago. We consider the former title much better adapted to the nature of the work than that which the author has now thought proper to give it; for we expect from annals of a medical subject, not a mere selection of cases which have come under the observation of a private individual, during a long series of years, but a well-arranged and periodical account of what has been done, and is doing, both in the theory and practice of that particular branch of medical science.

In subjects connected with medicine, cases, as being the facts on which our reasoning is founded, are undoubtedly of considerable use; but as there is much trouble in examining and comparing them, so as to obtain a knowledge of the nature,

nature, foundation, and result of the practice, it is always desirable that an author should present a general view of his subject, deduced from the individual cases which he brings forward; and this constitutes, in our opinion, the peculiar and valuable characteristic of the medical philosopher. An analysis of a work composed entirely of cases, as this is, must therefore be attended with some difficulty, and can only be carried to a certain extent. We must, therefore, content ourselves with selecting the more important of the pathological and curative observations contained in it, in order to enable our readers to judge of its nature and merit.

The volume contains one hundred and eight cases, which have occurred at various periods from the year 1771. To the perusal of them the author invites the rational and interested reader, as they "may not only, in some measure, afford a clue to medical researches; but in many instances serve as a directory to friends and relations, suspended between mistaken tenderness and irresolution, by which means the disease is protracted, and the unfortunate sufferer deprived of the early good effects, which a due sense of restraint in a situation distant from home, is generally more productive of, than ill-judged domestic indulgence in the first stages of insanity."

The circumstances which the author gives as the causes of insanity in the cases related by him, are, in general, such as have a place in most of the works on this subject already published, particularly in that by Dr. Arnold. He is disposed to attribute much force to hereditary influence; on which subject he observes, "that were we oftener to extend our inquiries by minutely tracing them back in a genealogical line to the progenitors of those labouring under confirmed mania, we should more generally adopt the opinion, that the much greater number of mankind, who become insane from any particular change in constitution, have an hereditary predisposition to madness; nor is this mere hypothesis and conjecture; the fact being founded on the solid basis of the most extensive observation and experience. Of the greatest number of maniacal patients that have been placed under my care in the course of more than thirty years practice, I have been able to trace an hereditary pretension to this disorder in by much the major part of them: to maintain this position, on the basis of sound fact, I have in most cases preserved an exact course of genealogy in regular lineal descent home to the destined object."

But of all the causes of this disease which appear to have an

an evident operation, the author affirms that religious enthusiasm is the worst; and that madness from this cause "is by far the most difficult of cure, and oftener than any other proves the source of despair, which terminates in suicide;" of which he gives several deplorable instances. He observes too, that if "instances of insanity are at this day more numerous in this kingdom than at any former period, we have abundant reason not only to attribute the principal cause of it to the present universal diffusion of wealth and luxury through almost every part of the kingdom; but also in support of this opinion to observe, that so humiliating a degradation of our reasoning faculties owes much of its accession to the absurd and ill-founded prejudices of that epidemic enthusiasm, which naturally excites the attention of weak minds to the discussion of religious points, which they too eagerly contemplate, without the power of clear comprehension, to the entire subversion of their intellectual discernment."

On the feelings which accompany madness, he is of opinion, that this calamity, though it reduces men below a level with the brute creation, "appears more terrible to the spectator than it really is; for he judges of the feelings of the unfortunate by his own, conceiving what himself, endowed with reason, would experience, if in his situation. By indulging an idea of what is impossible, and connecting reason with insanity, he feels intensely for the miserable situation of the lunatic, whilst the latter is insensible to any other uneasiness than what arises from the disappointment of his schemes, and the bursting of those airy bubbles that are formed by his own heated imagination. In some instances of insanity, there is such an assemblage of sense and madness, that the beholder is compelled to smile as well as compassionate: but the tear of pity will not flow less sincerely down the cheek of sensibility, because alternately blended with involuntary laughter."

One case of dissection is given, (Case 31,) which presents nothing peculiar; and the author apprehends, that no true judgment can be formed in such cases by examination after death, "as the morbid appearance of the brain has hitherto afforded but little elucidation to discover the cause of maniacal affections:" but he is of opinion, "that it might be of some advantage if those gentlemen who have frequent opportunities of dissecting the bodies of maniacal patients, were to describe with accuracy the different morbid appearances which present themselves. Perhaps some information might be derived from weighing the cerebrum and cerebellum of such patients as they

they have dissected, and from thence deducing such comparative inferences as should appear interesting or singular: although it is much to be feared the result of such researches, however ingenious, would fall very short of the desired effect; and the appearance, however diversified, leave the specific nature and the proximate cause of insanity still to dubious hypothesis."

Though the author wishes to avoid hypothetical reasoning, and professes to give it no place, yet we find, at p. 112, a pathological idea, which we must be excused in saying appears to us completely liable to the objection he would wish to shun: "I may be allowed," says he, "to observe with Dr. Battie, that though the brain is undoubtedly the seat of delusive sensation, nevertheless it is not the only one; forasmuch as sanguinary or serous obstructions in other parts are capable of exciting false ideas, in proportion to the medullary matter collected, so as to be compressed by such obstructions. Thus the stomach, intestines, and uterus, are frequently the real seats of madness, occasioned by the contents of these viscera being obstructed in such a manner as to compress the many nervous filaments which here communicate with one another by the mesenteric ganglia."

On this we shall shortly remark, that delusive sensation is neither a necessary accompaniment of insanity, nor an absolute sign of it. It frequently occurs in various affections of the senses without any other complaint. Obstructions, ossifications, depositions, enlargements, and diseased structure, occur in many diseases in which the slightest aberrations of mind are not observable; and unless the stomach, intestines, and uterus, be considered as distinct and independent sensoria; even if separated from the brain, they can hardly be ever regarded as the seats of madness *.

* The author mentions, in a note to a case of mania in a boy of 11 years of age, a circumstance recorded by Sorry, which can scarcely be thought to merit a place in any work of respectability. An insane woman was delivered on the 20th of January 1763 of a male child, who was *raving mad!!* "When he was brought to our workhouse, which was on the 24th, he possessed so much strength in his legs and arms, that women could at times with difficulty restrain him. These periods either ended with indescribable laughter, for which no evident reason could be observed, or else he tore in anger every thing near him, clothes, linen, bed furniture, and every thread he could get hold of; and we durst not leave him alone, or he would get on the tables and benches, and even attempt to climb up the walls: afterwards, however, when he began to have teeth, he fell into a general wasting, or decline, and died!"

"That persons under the influence of insanity are more subdolous than those afflicted with other indispositions, is an indisputable fact. And the generality of maniacs possess such a specious plausibility, as easily to deceive those who are unaccustomed to their stratagems and delusions; and it is very seldom, if ever, that they are found to act upon principles of veracity and gratitude. On the contrary, I can affirm from long experience, that mendacity and ingratitude generally accompany them through every stage of this afflictive disorder, often actuate them in their lucid intervals, until they are restored to a state of convalescence; and, as if a habitude was generated from madness, it seldom departs from them afterwards."

The last-mentioned circumstance (the continuance of mendacity and ingratitude after restoration to health) seems to us by no means reconcilable to the complete recovery both of mind and body, which the author affirms that great numbers of patients have had by his means; and it appears to us, that he has carried the idea considerably too far. Should such an idea become general, it could not fail to give very serious alarm to the friends and relations of any maniac. The common opinion, that "persons of the most brilliant genius and lively imagination are most subject to madness," is not confirmed by the author's observations: on the contrary, he asserts, that "madness proceeding from bodily complaints has no connexion with the greater or lesser extent of the original powers of the soul, and may as frequently afflict the ignorant and the idiot, as the philosopher and the scholar."

The mode employed by the author in the cure of mania is in general pretty much the same through the whole of the cases, and does not differ materially from the usual practice of judicious medical men.

Wherever the general strength of the patient, or the hardness or frequency of the pulse, seemed to indicate it, bleeding was ordered, and carried in some instances to deliquium; and even in a case where the pulse was low and weak, he regarded this state of it as a fallacious symptom, and took away blood with advantage. The head was frequently shaved, and setons made between the shoulders, or issues opened in different parts of the body. Blisters he seldom saw useful; emetics were generally given at certain intervals, and cathartics so as to obviate costiveness. He observes on this subject, "that emetics are in general capable of affording more essential service than cathartic remedies, and that the patient is generally much

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less debilitated by the former, than by the operation of the latter."

In most of the cases he gave the camphorated or nitrous mixture, camphor and opium, or camphor and nitre, singly, or conjoined with each other. Antimonials likewise he sometimes employed. Electricity he has tried, but often found it only to afford temporary relief. He attributes, however, a cure to it in three cases. Concerning warm and cold bathing he observes, "that instances of recovery from mania, by the patient being suddenly immersed in cold water, have been so numerous, as to have induced the experiment of cold bathing, the application of the clay cap, ice, and bonnet of snow; and some instances of cure have certainly occurred from the use of the shower bath, which by its sudden effect poured unawares upon the patient, deserves the preference in my opinion to any other immersion, when advantage is expected from that mode of treatment; but in general the unmanageable state of the patients when furiously insane, and to whom these applications are usually made, often prevents the effects of such remedies towards a cure. I never saw but one insane patient that could be said to be cured by cold bathing; but in the melancholy temperament, with great tension of the fibres, have often known abundant service derived from the warm bath."

A curious instance of the effects of the fear of water on maniacs is mentioned as occurring during the extraordinary inundation that happened at Glasgow in 1791, when "the water ran so high as to reach the cells of the mad-house. The dread of the water had an instantaneous and wonderful effect upon the lunatics, rendering the whole of them, even the most furious, quiet and tractable. They trembled like children, and suffered themselves to be conducted to apartments in the upper story, where they remained calm and peaceable as long as the court-yard continued covered with water; but this effect remained no longer than while the object of terror was in view."

On the effects of regimen he very properly lays great weight. The diet which the author in general prescribes is "light, spare, and attenuating;" and, considering the cause of the disease as frequently to depend upon "the turgescence of the cerebral vessels," he recommends an almost total abstinence from, or, at least, a very sparing use of liquids, in order that the circulating fluids may not be increased. Without making any observations on the propriety of this practice, we shall only observe, that the cases which he adduces as proofs of

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its success (Cases 62, 63, 64,) are not at all decisive, as the usual practice, in other respects, was conjoined with the peculiar regimen recommended by him.

Patients should always be kept under proper restraint, and must be taught to obey; they should not be allowed to ramble at large, as he is of opinion, "that no thorough security or dependance can at any time, or under any circumstance, be placed upon their words or actions." It is extremely difficult to form a judgment of the period at which persons who have been affected with mania may be liberated with safety. "It requires a very nice discrimination to distinguish whether patients, who have apparently recovered their senses, have been a sufficient time in the repossession of reason, to render it safe for them to return to their accustomed manner of life. For after recovery from a state of insanity, the mind is during some period of time as weak as the body, after violent diseases. As in the latter instance, patients cannot immediately return to the exercise and diet requisite in times of health, without imminently endangering a relapse, so in the former they cannot be admitted to those objects that they were accustomed to behold before their mental derangement, without hazarding an equal or a greater danger.

"A relapse in this case is more to be apprehended and guarded against, than in any other; and it should never be forgotten that such convalescents, either from a temporary sensation of joy, sudden prejudices, unaccountable aversions, an extravagance of superstitious notions, or any other cause, may suddenly have their mind put off its poize. Patients, therefore, under such circumstances, should be readmitted into society with a particular degree of caution and circumspection, as is evinced by numerous instances recited in the public prints, as well as from many authors who have written on the subject of insanity.

"There are amongst them some whose conversation is highly proper and rational, till some particular topic that lies dormant, and rankles in their minds, becomes the subject of conversation; then their insanity breaks forth into action. Thus amidst the most convincing proofs of a well-cultivated understanding, enriched with knowledge, such as is the greatest intellectual feast for human beings; touch but the favourite string, however slightly, and the mental faculties immediately lose all their harmony, and terminate in discord and derangement."

Having thus presented our readers with the general features

of the work before us, it becomes us to say, that we have found very little novelty either in the cases brought forward, or in the treatment employed. The Observations on Insanity published by Dr. Arnold, contain so many of the facts, from various writers, adduced by the author as cases illustrative of those he gives, and in translations so extremely similar, that we think it would have been prudent in him not to have passed over Dr. Arnold's work in silence. We observe, among many other instances, a very striking coincidence of opinion and expression between a sentence in page 322 of our author, and one in page 110, vol. i. of Dr. Arnold: the author gives it as an opinion, the result of many years observation, "that madness proceeding from bodily complaints has no connexion with the greater or lesser extent of the original powers of the soul, and may as frequently afflict the ignorant and the idiot, as the philosopher and the scholar." Dr. Arnold, on this subject, says "that madness from bodily causes has little, if any relation, to the greater or less extent of the original powers of the soul, and may equally seize on the wise man and the fool."

We cannot take leave of the author, without again remarking, that the benevolent views with which he professes to have published this work, would have been more likely to be carried into effect, had he presented us, at the same time, with the general result of his observations, and the principles upon which his practice is founded; which would assist very materially in giving us correct and arranged ideas on the subject.

Art. V. *Philosophical Transactions of the Royal Society of London, for the Year* 1800. *Parts II. and III.* Quarto.

(Concluded from vol. iv. p. 343.)

THE Philosophical Transactions for the year 1800 consist of Three Parts. The First Part has been already already reviewed. The Second Part, now before us, contains seven articles, viz. from xii. to xviii. inclusive.

The twelfth paper is *On double Images caused by atmospherical Refraction.* By William Hyde Wollaston, M.D. F.R.S.

In the late volumes of the Philosophical Transactions several instances of inverted refraction have been related, particularly by Mr. Huddart, Mr. Vince, and Mr. Dalby.

Dr. Wollaston here proposes, "1. To investigate, theoretically, the successive variations of increasing or decreasing density to which fluids in general are liable, and the laws of

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the refractions occasioned by them. 2. To illustrate and confirm this theory by experiments with fluids of known density: and lastly, to ascertain, by trial upon the air itself, the causes and extent of those variations of its refractive density, on which the inversions of objects, and other phenomena observed, appear to depend.

Our ingenious author comprises the general laws in three propositions.

" *Prop.* I. If the density of any medium vary by parallel indefinitely thin strata, any rays of light moving through it, in the direction of the strata, will be made to deviate during their passage, and their deviations will be in proportion to the increments of density where they pass.

" *Prop.* II. When two fluids of unequal density are brought into contact, and unite by mutual penetration; if the densities at different heights be expressed by ordinates, the curve which terminates these ordinates will have a point of contrary flexure.

" *Prop.* III. If parallel rays pass through a medium varying according to the preceding propofition, those above the point of contrary flexure will be made to diverge, and those below the same point will converge after their passage through it.

" *Cor.* Hence, adjacent portions of the converging rays will form a focus, beyond which they will diverge again; and the varied medium will produce effects similar to those caused by a medium of uniform density, having a surface similar to the curve of densities; since convergence or divergence will be produced, according as the curve of densities is convex or concave."

For the demonstrations we refer to the memoir itself, and shall proceed to extract a few of the experiments.

" Into a square phial," says Dr. W. " containing a small quantity of clear syrup, I put about an equal quantity of water, in such a way that it floated on the surface of the syrup, without mixing. By the mutual penetration of the water and the syrup, the following effects were soon produced. Through the syrup, a word written on a card placed behind was seen erect, and in its place. Through the adjacent variable medium, an inverted image was visible above the true place; and also, above that, a second image of the same object appeared erect. At first, the variations of density are so great, that the object may be in contact with the phial; but, when the variations of density become more gradual, and thereby the focus more distant,

distant, any object so near is only elongated, and must be removed an inch or two, to be seen inverted.

"Over the surface of the water, in the same phial, I next put about the same measure of rectified spirit of wine. At the stratum where the water and spirit united, the appearances were the same; but, since the refractive power of spirit exceeds that of water, the true place of the object was seen uppermost.

"I heated a common poker red hot, and looked along the side of it, at a paper ten or twelve feet distant. The rarefaction occasioned by it caused a perceptible refraction, to the distance of about three eighths of an inch from the side of the poker. A letter seen more distant from it appeared as usual; within that distance there was a faint image of it reversed; and still nearer to the poker, was a second image direct, and as distinct as the object itself."

Our author mentions several curious anomalies of atmospherical refraction; as when the sun shines, in particular circumstances, on a dark-coloured brick wall or on a level road, or on the sea-shore. To the solution of these we think he successfully applies his theory, as well as to some analogous phenomena, mentioned by Lalande in his *Astronomie*, and by Mr. Dalby, Mr. Latham, and Mr. Vince, in the Philosophical Transactions for 1795, 1796, and 1799.

We know not whether it may be worth while to add, that to our own eye, on going up Hampstead hill, some months ago, the top of Islington steeple, which was between us and the sky, appeared double. Apprehending some failure of sight, we mentioned the circumstance to our physician, Dr. Garnett, who jocularly asked, whether we had dined, at the time? We replied, that we observed it in our morning walk; adding that, as reviewers and authors, our visual organs were but little exposed to the cause of derangement to which he alluded. Dr. G. then said, that the phenomenon we observed might be owing to double atmospherical refraction, and referred us to the present paper, as the best he had seen on the subject. We accordingly perused it, and have not been disappointed. The theory, in our opinion, indicates very considerable philosophical and mathematical acumen, and the experiments have apparently been conducted with much ingenuity and address. Those we have cited are amusing, and may be easily repeated. The subject itself, however, is more than amusing; for, when the necessity of attending

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to refraction, in all astronomical and nautical observations, is considered, the present memoir must appear interesting in a high degree; as enabling observers to explain, and, in some cases, to allow for, deviations from the ordinary phenomena of atmospherical refraction. Such a case, for example, occurred to Captain Mudge in his late trigonometrical survey. (See the Third Part of this volume of the Philosophical Transactions, p. 720.) The uncommon distinctness with which he saw a distant building, having induced him to keep his eye longer than usual at the telescope, he observed the top of the building *gradually rise* above the micrometre wire, till it remained stationary at 10° 45′ above its first apparent situation. Had Dr. Wollaston's paper been published at the time, we presume it would have afforded that able mathematician satisfaction as to the cause of this phenomenon.

The thirteenth paper contains an *Investigation of the Powers of the prismatic Colours to heat and illuminate Objects*; *with Remarks that prove the different Refrangibility of radiant Heat: to which is added, An Inquiry into the Method of viewing the Sun advantageously, with Telescopes of large Apertures and high magnifying Powers.* By William Herschel, L.L.D. F.R.S.

This industrious cultivator of astronomy and optics begins the present paper by stating, that, in a variety of experiments which he made with an intention to ascertain the best method of viewing the sun with large telescopes, he used various combinations of differently coloured darkening glasses, and found that some of them gave a sensation of heat, but little light, and others much light with scarcely any heat. Hence he suspected, that the prismatic rays might possess the powers of heating, and of illuminating, bodies in very different degrees. In order to ascertain this point, he entered on a long and varied course of experiments, which he appears to have prosecuted with his usual diligence and ingenuity, and of which the following are the most prominent results.

From eight "experiments on the heating power of coloured rays," he found, as indeed might have been expected from what Newton had discovered, that $6\frac{7}{8}$ degrees of heat were produced by the red, or least refrangible rays, while but $3\frac{7}{8}$ degrees were produced by the green rays, and no more than $1\frac{3}{4}$ by the violet or least refrangible rays.

From nine "experiments on the *illuminating* power of coloured rays," he concludes, that the red-making rays are very far from having that power in any eminent degree; that the orange have more of it, and the yellow more still; that the

the greatest illumination lies in the brightest yellow or palest green; that from the deep green, the illuminating power decreases to the violet, which has very little. In distinctness, none of the colours appeared to be deficient.

From the power of heating being chiefly in the red-making rays, Dr. H. accounts for the warmth of a common fire, charcoal, &c. when in a red glow; and, on the other hand, for the different coloured flames of spirits, mixed with salt, giving comparatively little heat. His experiments, he thinks, ascertain, that radiant heat, as well as light, whether they be the same, or different agents, is not only refrangible, but is subject to the laws of dispersion arising from its different refrangibility. By several experiments, not here reported, it appears, that the *maximum* of illumination has little more than half the heat of the full red rays, and that the full red falls still short of the *maximum* of heat, which, perhaps, lies even a little beyond visible refraction. If so, radiant heat will at least partly, if not chiefly, consist, if the expression be allowable, of *invisible light*; that is, of solar rays, which have such a momentum as to be unfit for vision.

In the fourteenth memoir, entitled, *Experiments on the Refrangibility of the invisible Rays of the Sun*, Dr. Herschel gives some additional proofs, that the range of the refrangibility of radiant heat is more extensive than that of the prismatic colours.

From the experiments here described, he thinks himself justified in concluding, that there are rays coming from the sun, which are less refrangible than any of those that affect the sight, and which are invested with a high power of heating bodies, but none of illuminating them; for at the distance of fifty-two inches from the prism, there was still a considerable heating power exerted by the invisible rays, one inch and a half beyond the red rays, the thermometer having there risen $3\frac{1}{3}$ degrees in ten minutes:

That the power of heating is extended to the utmost limits of the visible violet rays, but not beyond them; and that it is gradually impaired as the rays grow more refrangible:

That the *maximum* of the heating power is vested among the invisible rays; and is probably not less than half an inch beyond the last visible ones; that the sun's invisible rays, in their less refrangible state, and considerably beyond the maximum, still exert a heating power fully equal to that of red light; and that, consequently, the invisible rays of the sun probably far exceed the visible ones in number.

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If this be a true account of solar heat, (and for the support of it, Dr. H. appeals to his experiments,) it only remains for us to admit, that such of the sun's rays as have the refrangibility of those in the prismatic *spectrum*, by the construction of the eye, are admitted under the appearance of light and colours; and that the rest being stopped in the coats and humours of the eye, act on them as they do on the rest of our body, by occasioning a sensation of heat.

The fifteenth article contains Dr. Herschel's *Experiments on the solar and on the terrestrial Rays that occasion Heat; with a comparative View of the Laws to which Light and Heat, or rather the Rays which occasion them, are subject, in order to determine whether they are the same, or different.*

After premising some explanations to prevent his meaning from being misunderstood, and the object of his researches from being misrepresented, our diligent philosopher here distinguishes heat into six kinds, three solar and three terrestrial; but, as the solar and terrestrial divisions strictly resemble each other, he reduces his subject to three heads: 1st, Heat directly from the sun, or from lamps, &c.: 2dly, Heat from the solar, prismatic spectrum, or from culinary fires openly exposed; and 3dly, Heat from radiants, where neither light nor colour can be perceived, as from the vicinity of the prismatic spectrum, or from red-hot iron cooled till it cannot be seen in the dark. From the present series of experiments Dr. H. concludes,

That the rays of the sun, after undergoing three regular reflections, had a power of occasioning heat, having raised the thermometer 58 degrees:

That the prismatic colours, if not the heat-making rays, are at least accompanied by such as have a power of occasioning heat, and are liable to be regularly reflected:

That certain rays, whether those that shine or not, issuing from an ignited poker, and from an open coal fire, are subject to regular reflection, and have a power of heating bodies:

That not only there are invisible rays of the sun, which are regularly reflected; but that those rays are capable of being condensed by a concave mirror, so much as to raise the thermometer 24 degrees in two minutes:

That the solar heat is subject to the laws of refraction, having raised the thermometer 70 degrees, after undergoing eight regular successive refractions.

That rays invested with a power of heating bodies, issue from a candle, and are subject to refraction nearly the same

with those of light. The laws of refraction also extend to the heat of a red-hot iron and of a chimney-fire.

That the invisible heat-making rays of the sun are accurately refracted to a focus; where, in one minute, they raised the mercury 45 degrees:

That there are rays issuing from hot iron, which, though totally invisible, have a power of occasioning heat, and obey certain laws of refraction, very nearly the same with those which affect light.

We shall defer the few remarks we may take the liberty to offer on Dr. H.'s papers, till we come to the remainder of the preceding one which is inserted in the Third Part of the Transactions for 1800.

The sixteenth article is entitled, *Chemical Experiments on Zoophytes, with some Observations on the component Parts of Membrane.* By Charles Hatchett, Esq. F.R.S.

In the year 1799 Mr. Hatchett submitted to the Royal Society some experiments and observations on shell and bone, which he here recapitulates, and then proceeds to the immediate subject of the present memoir.

The species he examined were the *Madrepora virginea, muricata, labyrinthica, ramea,* and *fascicularis;* the *Millepora cærulea, alcicornis, polymorpha, cellulosa, fascialis,* and *truncata;* the *Tubipora musica*; the *Flustra foliacea*; the *Corallina opuntia;* the *Isis ochracea* and *hippuris*; the *Gorgonia nobilis, ceratophyta, flabellum, suberosa, pectinata, setosa,* and *antipathes;* the *Antipathes ulex* and *myriophylla*; many species of sponges: the *Alcyonium asbestinum, ficus,* and *arboreum.* These were the principal subjects of the author's attention in the experiments here described. The acid to whose action they were submitted was dilute nitric acid.

The author's attention was ptincipally directed towards ascertaining the presence and general proportions of carbonate and phosphate of lime, as being essentially employed by nature to communicate rigidity and hardness to shell and bone; and, though magnesia, silex, iron, with some alkaline and neutral salts, might be occasionally present in small proportions, (and were sometimes detected,) yet from their little influence on the general characters of the bodies examined, he, for the present, neglected them. The author's next object was, to examine the substances in and upon which the hardening principles were secreted and deposited.

"It appears," says Mr. Hatchett, "that the hardening principle, or carbonate of lime, together with a substance va-

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rying from a very attenuated gluten to a tough jelly, and from this to a perfectly organized membrane, concur to form the matter of shell; and, from the result of the experiments, and from all circumstances, there is every reason to believe, that the substance with which, or upon which, the carbonate of lime is mixed or deposited, is of a similar nature, and differs only in relative quantity and density, arising from progressive changes (peculiar to the various species of shells) produced by certain degrees of natural inspissation, and by an organization more or less perfect.

"The experiments made on teeth, and on the bones of various animals, elucidated and confirmed the observations made on the nature of shell; for,

"1st, The enamel of teeth (in relation to the other bony substances) was proved to be as the porcellaneous shells are to those formed of mother of pearl; the cementing substance of the enamel being a gluten, in the same state, and apparently of a similar nature, with that of the porcellaneous shells. And,

"2dly, In certain bones, particularly those of fish, (such as some of the bones of the skate,) the substance which remained after the solution of the phosphate of lime, was of a gelatinous consistency, and exhibited but very imperfect traces of organization; by the others, however, a completely formed membrane or cartilage was left, retaining the figure of the original bone.

"When therefore the component parts of shell and bone are considered, it appears that the essential characteristics are, carbonate of lime for the one, and phosphate of lime for the other; and that their bases consist of the modifications of a glutinous, gelatinous, or membranaceous substance."

The industrious author proceeds to review his experiments on zoophytes, and to examine how far they agree with those he formerly made on shell and bone; and, upon the whole, he thinks "there is reason to conclude that the varieties of bone, shell, coral, and the numerous tribe of zoophytes with which the last are connected, only differ in composition by the nature and quantity of the hardening or ossifying principle, and by the state of the substance with which it is mixed, or connected. For the gluten or jelly which cements the particles of carbonate or phosphate of lime, and the membrane, cartilage, or horny substance, which serves as a basis, in and upon which the ossifying matter is secreted and deposited, seem to be only modifications of the same substance, which

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progressively graduates, from a viscid liquid or gluten, into that gelatinous substance which has so often been noticed, and which again, by increased inspissation, and by the various and more or less perfect degrees of organic arrangement, forms the varieties of membrane, cartilage, and horn."

The author begins his "observations on the component parts of membrane," by remarking, that though *gelatin*, more or less soluble in water, was obtained from sponges, gorgoniæ and many other marine bodies, yet that in his investigation of the composition of membranes, animal jelly still more frequently occurred. In many cases, from the small quantity of the body, and consequently of the gelatin, he could only ascertain its presence, by the test of the tanning principle, and by nitro-muriate of tin; but in other experiments, when the solutions had been reduced by evaporation, he could often observe the various degrees of viscidity and tenacity of mucilage, size, and glue.

Mr. Hatchett observes, that gelatin, according to its quantity and quality, powerfully influences the flexibility, elasticity and putrescibility of the bodies in which it exists; and as an example of the preserving power of gelatin, he mentions the skin of the rhinoceros found on the banks of the Vilui, near Yakutsk.

As the gelatin in animal bodies is probably liable to morbid affections, our author expresses a wish, that medical gentlemen would ascertain how far the tonic properties of barks depend on the tanning principle. Mr. Biggin has proved, (Philosophical Transactions, 1799,) that willow bark, especially that of the Huntingdon or Leicester willow, equals that of oak in yielding tanning matter. The Rev. Mr. T. Beckett, of Spetisbury, Dorsetshire, our author assures us, has successfully used common willow bark as a tonic and febrifuge. And Mr. Westring observes, (Ann. de Chim. tom. xxxii. p. 179,) that the cinchona which contains the most tanning matter, is the most efficacious in fevers. At the same time Mr. Hatchett hopes, that the medical properties of nitro-muriate of tin will be attended to.

The cartilaginous body, which remains after the gelatin has been separated from bone or ivory by long boiling in water, or by a dilute acid, our author observes, is not easily soluble in dilute acids; but in concentrated nitric acid, or in boiling dilute acid, it is rapidly dissolved. This substance, when dry, is semi-transparent, like horn, and more or less brittle. It is the predominating part, in the tissue or web of membrane,

 cartilage,

cartilage, sponge, the horny stems of gorgoniæ, horn, hair, feather, quill, hoof, nail, horny scale, crust, and tortoise-shell.

Mr. Hatchett proceeds to make observations on albumen and muscular fibre, in which we are sorry our limits will not allow us to follow him minutely. He tells us, that, on comparing the chemical properties of the substance which remains after separating the gelatin from animal substances, there can scarcely be a doubt, that it is one and the same substance in different states of density and texture. This was proved by, 1st, The effects of fire and the products by distillation; 2dly, Its very difficult solubility by long digestion in boiling water; 3dly, The effects of re-agents on the water in which bodies like inspissated albumen or tortoise-shell had been boiled; 4thly, The effects of acids (particularly nitric acid,) of ammoniac, and of caustic lixivium of potash; 5thly, The animal soap which was formed; and the precipitate from it, by acetous or muriatic acid; and, 6thly, The difficult putrefaction of this substance when pure and dense.

These common properties appear to our author, and indeed to us, fully to prove, that it is the same substance which forms the principal part of membrane, sponge, horn, hair, &c. and even of muscular fibre. And, upon comparing the properties of this substance with those of pure inspissated albumen, so evident a resemblance appears, that he believes few will doubt albumen to be the original substance from which tortoise-shell, hair, horn, muscular fibre, &c. have been formed.

The seventeenth paper is *On the Electricity excited by the mere Contact of conducting Substances of different Kinds.* In a Letter from Mr. Alexander Volta, F.R.S. Professor of Natural Philosophy in the University of Pavia, to the Right Hon. Sir Joseph Banks, Bart. K.B. P.R.S. dated "Como in the Milanese, 20th March 1800."

Of this interesting paper, which is in French, we shall present our readers with as particular an analysis as our limits will allow; giving the sense, rather than a verbal translation of the language of the author.

He tells us, that the most interesting result of his experiments on this species of electricity, is the construction of an apparatus, which he calls the *artificial electric organ*, to distinguish it from the *natural electric organ*, in the torpedo and electrical eel; and which is as follows.

Take pieces of copper, or rather of silver, (coins for example,) and of pieces of tin or rather zinc, and bits of card, leather,

leather, or broad cloth, to the number of thirty, forty, fifty, sixty, or more of each, and all of nearly the same size, soaking well the cloth, which seems to answer the best, in fresh water, or water saturated with common salt, muriate of ammoniac, or nitre. Then place a piece of zinc, silver, and cloth, on each other, and above them another piece of zinc, silver, and cloth, and so on, still preserving the same order till the pile be completed. We said, that the pieces of metal and cloth should be nearly of the same size: the metallic ones may be exactly so; but the bits of cloth should be a small matter less, and, though well soaked, they should be gently squeezed before they are laid on the pile, to prevent the superfluous fluid from running down its sides, and penetrating between the metals. To keep the pile from tottering or falling, it should be erected on a piece of wood, into which are fixed three or more rods of wood or glass, forming a circle somewhat exceeding the pile in diameter; and these rods are always to be kept almost, or altogether, free from moisture. Another smaller piece of wood, with a hole for each rod, may be fitted on the top of the pile, to keep its component plates in close contact.

The effects of this pile are very similar to those of a common electrical battery of a very great surface, when charged to a low degree; but, in one respect, the pile far surpasses such a battery; for it supplies an uninterrupted stream of the electric fluid through any conductor connecting the highest and lowest plate.

Our author assures us, (and indeed we have experienced,) that a pile consisting of twenty sets of plates, will not only affect Cavallo's electrometer, assisted by a condenser, but will communicate sensible shocks to the fingers, when well wetted, as often as they are applied to the two extremities of the pile. The intensity of these shocks will be increased, if the finger, and still more if the whole hand, be immersed in a basin of water, communicating by a thick wire with the bottom of the pile, while the other grasps pretty firmly a wetted large metallic plate, the end of which is brought into contact with the top of the pile. The effect is also increased by adding to the number of pieces. A pile of forty or fifty sets of plates will make the shock extend to the shoulders, especially that answering to the hand held in the water, which, by frequent and rapid repetition, will be more or less benumbed. If the finger only be immersed, the pain will become insupportable to that finger, as it will to any part which happens to be slightly wounded.

wounded. An augmentation of the effect is likewise produced by touching the pieces successively with the metallic plate, beginning at the third or fourth piece, and continuing the contacts upwards to the top where the shock of the pile is the greatest. Lastly, it has been found that the action of the pile is much promoted by elevation of temperature in the ambient air, in the water which moistens the cloths of the pile, and in the water contained in the basin.

Our ingenious author considers, at some length, the effects of the pile on the different senses, and first on that of feeling. If, while the hand is deeply immersed in the water in the basin, the forehead, the eyelid, the point of the nose, or any other part where the skin is tender, be well wetted, and gently pressed against a wire communicating with the other extremity of the pile, a pricking sensation is felt, which, if the contact be every often repeated, terminates in a disagreeable trembling. If the communication be kept up, without any interruption of the circle, a sharp pain soon begins to be felt about the point of contact, which increases till it becomes so insupportable that the experiment must be discontinued.

With regard to the taste, our author still adheres to the opinion expressed in his first memoir, in which he opposed Galvani's notion, that the effect was to be attributed to a pretended animal electricity; he affirms it, on the contrary, to be an extrinsic electricity, excited by the contact of metals of different species. He says, that, in consequence of his attributing this power to metals, he discovered that two pieces of different kinds, and in particular that the contact of one of silver and another of zinc, produced on the tongue evident sensations of taste; that this taste was decidedly acid, if the end of the tongue was turned towards the zinc, and the electric current entered it; that another taste, weaker but more disagreeable, and inclining to alkaline, was perceived, when the position of the metals was reversed, and the electric current proceeded from the tongue; and that these sensations continued and even increased, while the contact of the metals was preserved. And here our author adds, that if a pile of thirty, forty, or more sets of plates, enter into the circle, the tongue is not only affected with the taste just mentioned, but with a transient shock, more or less painful, succeeded by a durable sensation of taste. This shock even convulses a part or the whole of the tongue when the pile is more considerable, and consequently more active. Our author found, that the sensations now described were best produced by applying the tongue

tongue to the end of a pointed metallic rod communicating with one extremity of the pile, while one or both hands were connected with the other.

As to the sight, which our author first found to be affected by the simple contact of two different metals, particularly zinc and silver, he naturally expected that the sensation of light would be proportionally augmented by his apparatus; but he was surprised to find that a pile of ten, twenty, thirty, and even more sets of plates, did not produce a longer, more extensive, or much more vivid flash, than the contact of two pieces of metals. This slight sensation of light, however, is excited by the apparatus more easily and in a greater variety of ways. With a single pair of metals the phenomenon can scarcely be produced by any other methods than, 1st, By applying one of the pieces to the bare bulb of the eye, or to the eyelid, well wetted, and bringing it into contact with the second piece of metal applied to the other eye, or held in the mouth; or 2dly, By grasping the second piece with the wet hand, and making it touch the other; or 3dly, By applying both the pieces to the internal parts of the mouth, and bringing them into contact. But, with a pile of twenty or thirty sets of plates, the flash is produced, if the hand communicate with one extremity of the pile, and a metallic rod or plate, connected with the other, be brought into contact, not only with the eye, or any part of the mouth, but with the forehead, the nose, the cheek, the lips, the chin, and even with the fore part of the neck, provided these parts be well wetted.

Our author, after many fruitless attempts to affect the sense of hearing by the contact of a rod of zinc, and one of silver, and another of gold, at last succeeded by means of an apparatus consisting of thirty or forty sets of plates. He introduced far into each ear a metallic rod, (of what metals he does not say,) rounded at the end. On bringing these rods into immediate communication with the extremities of the pile, he received a shock in the head, succeeded by a crackling noise, which had some resemblance to that attending the ebullition of some tenacious matter. This noise continued, without augmentation, or diminution, all the time that the circle was complete; but the sensation was so disagreeable, and, for aught the author knew, so dangerous, that he has not often repeated the experiment.

The author has not yet been able to affect the organ of smelling by his apparatus, otherwise than with a prickling sensation,

sensation, more or less painful and extensive, according as the electric current is more or less strong.

As the pile can only act for a limited time, and requires frequent renewal, in order to restore the decayed moisture of the pieces of cloth, and to clean the zinc plates, which are rapidly corroded by the electric current, M. Volta contrived another apparatus, which is free from these inconveniences. It consists of a straight or circular series of thirty, forty, or sixty wine-glasses, or tumblers, about half full of fresh or salt water, and which are connected in a kind of chain, by metallic arcs, each having a plate of silvered copper, about an inch square, soldered to one end, and a plate of zinc of the same size to the other; the plate of silvered copper being wholly immersed in the water in the first vessel, and the plate of zinc in that of the second; then a plate of silvered copper in the water of the second vessel, and a plate of zinc in that of the third, &c. Thus the copper in the first vessel is connected by its metallic arc with the zinc in the second; the copper in the second, by its arc, with the zinc in the third; the copper in the third, with the zinc in the fourth; and so on; still preserving the same order in the succession of metallic plates. The arcs may be made of wire, and even of a different metal from those of the plates. This apparatus is essentially the same with the pile, and produces its effect in a similar manner; namely, by plunging one hand or finger in the first glass, and the other hand or a finger in any other glass. The farther this last glass is distant from the first, the greater will be the effect; and consequently the greatest effect of this apparatus, as of the pile, will be produced by the two extremities. Thus far we have analysed the memoir of Signor Volta.

Soon after its arrival in this country, and before it had been read in the Royal Society, similar piles were constructed by Mr. Carlisle, Mr. Nicholson, Dr. Garnett, Mr. Cruickshank of Woolwich, and many other gentlemen in various parts of this kingdom; but the necessity of cleaning the plates of zinc, and moistening those of cloth or card every second or third day, was found to be very troublesome. An apparatus formed of glasses is much more easily kept in order; but it takes up a great deal of room, as at least one hundred glasses are required to produce any considerable effect. To obviate these inconveniences, Mr. Cruickshank (whose merit, which has been long known to us, begins to meet with suitable attention) contrived an apparatus free from the imperfections of those of Signor Volta. It consists of a trough of baked wood

26 inches in length, 1.7 inches in depth, and 1.5 inches in width. Pairs of silver and zinc plates, each 1.6 inches square, soldered together, were let into opposite grooves, about $\frac{1}{10}$th of an inch deep, in the sides of the trough, of which three were cut in the space of 1.3 inches; so that the trough, now divided into cells, contained sixty pairs of plates. The passage of any fluid from one cell to the other was prevented by very carefully cementing the pairs of plates into the grooves, with a mixture of rosin and wax; a precaution which must be strictly attended to; for should any fluid pass from one cell to another, or insinuate itself between the plates, the action of the apparatus would be exceedingly impeded. When the trough had been completed, and the plates regularly fitted in, as in the pile, always keeping the silver on the same side, the cells were filled with a solution of muriate of ammonia, which answered much better than the moistened cloths, or cards, in the pile. A communication being now made between the first cell and the last, the arms received a strong shock, which was quicker, less tremulous, and more resembled a shock of electricity than that given in the pile. Mr. Cruickshank prepared two of these apparatus, containing in all one hundred pairs of plates, and which, when united, gave a very strong shock, and the spark could be taken from them, at pleasure, even in the daytime. In this apparatus, the zinc plates may be easily cleaned, by filling the cells, for a few minutes, with dilute muriatic acid.

We have briefly described Mr. Cruickshank's apparatus, because it is a valuable improvement of the happy discovery which is the subject of the present article. We are sorry that our limits will not allow us to notice the discoveries of Mr. Nicholson, Mr. Carlisle, and Mr. Davy; and the want of observations precludes us from giving any opinion on the effects of galvanism as a medical agent, which, as it may be transmitted in any degree of intensity, and for any length of time we please, through a diseased part, will, in all probability, be very considerable.

Those who wish to know more of this subject than can be expected in a Review, may consult Nicholson's Journal, vol. iv.; the Annals of Philosophy, vol. i.; and the Supplement to the Encyclopædia Britannica.

The eighteenth paper consists of *Some Observations on the Head of the Ornithorhynchus paradoxus.* By Everard Home, Esq. F.R.S.

The specimens of this curious anomaly of the animal creation

creation which have reached Europe, having raised, without gratifying, the curiosity of naturalists, the present paper is intended as a description of the very extraordinary peculiarities of its head, as far as the same could be ascertained from the skin of a very large one, which had been preserved in spirits. The beak of the ornithorhynchus, which, on a cursory view, so strongly resembles that of the duck, is found not to be the animal's mouth, but a projection beyond it. The cavity of the mouth is situated as in other quadrupeds, and has two grinding teeth on each side, both in the upper and lower jaw; but, instead of incisor teeth, the nasal and palate bones are continued forward, lengthening the anterior nostrils, and forming the upper part of the beak; and the two portions of the lower jaw, instead of terminating at the symphysis, where they join, become two thin plates, and are continued forward, forming the under portion of the beak.

PART III.

THE Third Part of the Philosophical Transactions for 1800, though consisting of nearly three hundred pages, contains only two papers, the first of which is the second part of Dr. Herschel's *Experiments on the solar and the terrestrial Rays that occasion Heat; with a comparative View of the Laws to which Light and Heat, or rather the Rays which occasion them, are subject, in order to determine whether they are the same, or different.*

The ingenious author having, in the first part of this paper, shewn the great similarity of terrestrial to solar light and heat, with respect to reflection and refraction, here proceeds to point out some striking differences between them. Whether the heat-making rays, he observes, be the same or not with the colour-making rays, (which his experiments have not ascertained,) the arguments for their different refrangibility rest on the same foundation, namely, their being dispersed by the prism.

But one material difference is, that the rays of heat are of much more extensive refrangibility than those of light; since the heat-making rays reach from the violet extremity of the coloured prismatic spectrum, to considerably beyond the red extremity.

Neither do they agree in their mean refrangibility, or in their *maxima*; for where there is most light there is but little heat; and where there is most heat there is no light at all.

Dr. H. then endeavours to prove experimentally, that the

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sines of refraction of the heat-making rays are in a constant ratio to the sines of incidence; that their different refrangibility may, like that of light, be corrected by contrary refraction in different media; and that in burning-glasses, the focus of the rays of heat is different from that of the rays of light; but he acknowledges, that this last conclusion was drawn from a coarse experiment.

Our author next examines the transmission of solar light through colourless glasses, and of solar heat through glasses of the prismatic colours, through liquids, and through scattering substances, as glasses rubbed with emery, &c. He then comes to the transmission of flame-heat, and of heat from a red-hot fire without flame. Then follows the transmission of invisible terrestrial heat, the most interesting of the whole.

The next branch of the subject is the scattering of solar heat, or the reflection of it by rough surfaces, as those of all bodies may comparatively be called. It appears, that light and heat are scattered in very different proportions. Black velvet scatters 1000 rays of heat, and only 7 rays of light; but gold paper scatters 578 rays of heat, and 124,371 rays of light.

The Doctor, after combating the arguments of those who would have the rays of heat do also the office of light, observes, that no kind of regularity obtains among the proportions of rays of one sort and of the other, which are stopped in their passage; and that heat and light seem to be entirely unconnected. Thus the bluish white and flint glasses stop nearly thrice as much heat as light; but the greenish crown glass stops only about one fourth more of the former than of the latter.

The prism separates invisible heat from the coloured spectrum, and that heat of the same variety of refrangibility as the different colours is contained in that spectrum. The question, therefore, is reduced to this single point; Is the heat which has the refrangibility of the red rays occasioned by the light of those rays?

That a candle emits heat along with light, the thermometer has ascertained: and that some of it must be invisible, follows from comparing the light and heat stopped by different glasses. Thus a bluish white glass stops 86 rays of light, and 625 of heat. Hence, if only visible rays of heat came from the candle, the dark-red glass which stops 999.8 rays of light, ought to stop all heat whatever. This instance alone Dr. H. thinks a proof of the existence of invisible terrestrial heat in a candle;

candle; while heat from visible rays remains to be established by those who believe that there are any such.

Dr. Herschel very properly abstains from engaging to shew in what manner heat-making rays produce or occasion heat, and from disputing with those who still believe that light comes to us from the sun not by rays, in the way of emanation, as Newton thought, but by the supposed vibrations of an elastic ether, as Euler maintained. Without derogating from the ingenuity and industry here displayed by Dr. Herschel, we may venture to observe, that he would have done well to have imitated still more than he has done the father of the philosophy of light, in that caution, which (as his friend Maclaurin observes) was as conspicuous in Newton as his sagacity. In other words, considering the uncommon subtilty and fugacity of the subject, and the extreme circumspection necessary in such fine experiments, would it have been amiss, if our author had thrown several of his conclusions into queries? Their present spirit and form seems somewhat too affirmative for a subject in which so many mistakes have been made, and in which the hitherto unparalleled Newton did not wholly escape error. This our suspicion has derived strength from the remarks on Dr. H.'s papers, which Mr. John Leslie has inserted in the 45th and 46th numbers of Nicholson's Journal. In the present sceptical state of our minds, it would be absurd in us to offer any opinion of our own; especially as we have neither time nor opportunity to correct that scepticism by the touchstone of experiment.

The second and last paper in this Third Part of the Philosophical Transactions for 1800, is *An Account of the trigonometrical Survey carried on in the Years* 1797, 1798, *and* 1799, *by Order of Marquis Cornwallis, Master-general of the Ordnance.* By Captain William Mudge, of the Royal Artillery, F.R.S. Communicated by his Grace the Duke of Richmond, F.R.S.

We participate in the satisfaction which every friend to his country must feel from the probability of our at last obtaining an exact map of these kingdoms, so important to the nation, and so creditable to the accurate sciences. But of this interesting paper it is not in our power to present our readers with an abridgment, or even with any thing deserving the name of an epitome. Though by no means prolix, considered as a description of a variety of complicated and arduous operations, and partly intended for the guidance of future artists, it occupies near 200 pages, and comprises many details which would be uninteresting, and calculations, or materials for calculations, which would be unintelligible to most of our readers. The

memoir

memoir is divided into four sections: Section I. contains "Particulars relating to the Operations in the Year 1797."—Section II. is "A Determination of the Latitudes and Longitudes of the Stations on Black Down in Dorsetshire, Butterton in Devonshire, and St. Agnes Beacon in Cornwall."—Section III. contains "Trigonometrical Surveys of the northern and western Parts of Kent, and Parts of the adjoining Counties, Suffolk, and Hertford, executed in the Years 1798 and 1799."—Section IV. is "A Determination of the Altitudes of the Stations above the Level of the Sea; and the mean Refractions deduced from observed Angles of Elevation and Depression."

The work is illustrated by seven plates.

Some idea may be formed of the accuracy of the admeasurements from what Captain Mudge states, p. 588: "On ground," says he, "sufficiently hard, and otherwise favourable, I think a base of five miles might be measured so accurately, as to afford a result not differing from the truth more than three inches; but, on this occasion, I should not suppose the error can be less than six nor more than nine inches." The base here alluded to measured above five English miles. We have read *on paper*, of greater accuracy than what our able author says *might be* attained in favourable circumstances, but do not believe that greater was ever *really* practised upon *terra firma*.

ART. VI. *Observations on the medical and domestic Management of the Consumptive; on the Powers of Digitalis purpurea; and on the Cure of Scrophula.* By THOMAS BEDDOES, M.D. Octavo. 394 pages. LONGMAN and REES, London. 1801. Price 7*s*.

THE author of this work, in his Advertisement, observes, that a slight acquaintance with our most modern medical literature is sufficient to prove, that the attention lately paid by practitioners to the causes and cure of consumption has been productive of effects very beneficial to society, by leading to a practice "which is highly efficacious, both in producing a diminution of suffering where it cannot preserve life, and in preserving life where every other method would be unavailing."

Placing, as we do, confidence in this assertion, it is impossible not to feel a conviction of the reasonableness of those exertions which are daily making towards the improvement of the

the medical art; and a reverence, on account of the evident progressiveness of the most useful of the human faculties.

Perhaps no disease has ever produced, in this island, so great a mass of painful sensation as consumption; its ravages are most felt by the best part of the human race; and its slow approaches, and the apparent certainty of its fatal termination, in general, occasion not less pain to the sufferer, than anxiety to the beings connected with him by the ties of sympathy and affection. That means have been discovered capable of preventing this disease, or of checking its progress, ought therefore to be a subject of national joy; and perhaps too much encouragement cannot well be given to those men, who, despising common prudential motives, have combatted established prejudices and ancient medical axioms in labouring to ascertain their efficacy.

Dr. Beddoes's excellent Essay on Consumption has been formerly noticed by us *. The work before us may, in some measure, be considered as an appendix to it. In the Essay on Consumption, the advantages of a modified and permanent temperature in the cure of diseases, and the agency of *digitalis purpurea*, were only generally noticed; in the tract before us they are fully examined, and their relations to each other ascertained.

This tract is divided into three parts, each of which may be considered as a distinct essay. The first is "*Considerations on a modified Atmosphere in consumptive Cases*;" the second, "*On the Power and Agency of Digitalis*;" and the third, "*Observations on the Cure of Scrophula.*"

The "*Considerations on a modified Atmosphere*," &c. are well worthy of the attention both of professional and unprofessional inquirers. They include an account of seven cases, chiefly of pulmonary affections, which were treated by a modified atmosphere only, either simply warmed, or impregnated with animal vapours; and of other cases in which the operation of artificial warmth was assisted by the use of medicine.

The facts relating to the cure of pulmonary affections, by removal from a cold into a warm climate, are well known; and the latest researches of chemical philosophers have proved, that the composition of the air, with regard to the proportions of its principal constituent parts, is nearly the same in every country. These circumstances would induce us to believe, that temperature is the great agent in effecting the change of

* Med. Rev. vol. ii. p. 1.

health

health connected with change of climate. Dr. Beddoes appears to have adopted this opinion, and to have been influenced by it in his experiments.

After having considered the various modes in which a permanent temperature could be established, he was induced, "partly from rumour, and partly from the peculiar point of view in which he took up the treatment of the disease," to fix upon "living with cows," as the practice most likely to improve the condition of pulmonary ulcers; and, after several unsuccessful attempts, in which disappointment and disgust, in consequence of common prejudices, were frequently experienced, he at length succeeded in gaining decisive proofs of the occasional efficacy of this practice.

Four cases of pulmonary affection, in which the patients were confined with cows for a considerable time, are related. Two of them were in a great measure successful; the others terminated fatally.

The first case, that of Mrs. Finch, is highly interesting; both on account of the distinctness of the effect, and the minuteness and accuracy with which the progress of the cure is detailed. Mrs. Finch had been for several months sinking under a complaint, that, except with regard to the pulse, which was seldom above 76, had every appearance of pulmonary consumption. She had purulent expectoration, regular chills and heats, profuse nocturnal perspirations, and the usual diminution of strength and flesh. After it had been found that digitalis had produced unpleasant effects, without the smallest advantage, a sea voyage, or the alternative of constant residence with cows, was recommended. The last was adopted, and the results of it we shall give in the language of the author.

"A stable adjoining to one of the houses in Gloucester Row, Clifton, twenty feet long, fourteen wide, and nine high, with a small recess, was engaged; and a space sufficient to contain a moderate bed, with a little room to place a table and move about, was partitioned off; and this part was raised, by coarse boards, a few inches above the ground of the stable. Two cows were first placed in the other part of the building, for a few days before Mrs. Finch took up her abode in it.

"The complete journal of this case would furnish materials for a book of moderate size. It will, however, be sufficient to describe the remarkable changes in Mrs. Finch's feelings, and in the symptoms.

"The first night she had been oppressed in her breathing, and the next day I prevailed upon her to apply a blister to the chest,

chest, though she predicted that it would exhaust her, without producing any good effect. The following night there was little or no oppression; and the air henceforward became in the highest degree grateful, or, as Mrs. Finch termed it, balsamic. The night-sweats abated, and soon ceased altogether.

"Within about a week from her entrance, she was obliged to sleep a night out of the cow-house, on account of some alteration. That night the hectic symptoms, and particularly the perspiration, returned.

"In about six weeks, she slept, for the same reason, three nights in a common apartment. The night-sweats had now long since ceased, nor did they return the two first nights; but the third, the lower extremities were bathed in perspiration. The air of the apartment was kept three degrees higher than that of the cow-house; but the breathing was laborious, and instantaneous relief took place on returning to the cow-house. On a third subsequent removal into the lodging-house, for about a week, no sign of relapse occurred.

"I had been endeavouring to persuade a gentleman, who had resided two or three winters at Lisbon without the smallest advantage, to try the cow-house, rather than return to Portugal. He was curious to have a statement of Mrs. Finch's feelings. I have preserved the note she wrote on that occasion. It was about a fortnight after her entry into her humble abode. The account is as follows:

"'Mrs. Finch's compliments to Mr. ——: she can assure 'him that she has found a cow-house a much more comfortable 'abode than she had formed an idea of.

"'During the nights, particularly, she has experienced a 'genial warmth, which has relieved the oppression on the chest, 'taken off restlessness, and given a feeling she cannot better 'describe, than by saying it is as if nourishment was con'veyed through the pores of the skin. So different have been 'her feelings from those of the last six months, that she should 'reluctantly change her apartment for the night, however she 'might wish a cleaner and more cheerful one for the day.

"'*Cow-house, Oct.* 8.'

"The symptoms gradually abated. In ten weeks there was no vestige of hectic fever; and the cough and expectoration ceased entirely for two days together. The expectoration would return, at longer and longer intervals, in a quantity not exceeding the bulk of a garden pea. But whenever there was the

smallest quantity of expectoration, (and it now took place only in the morning,) it never failed to be preceded by distinct febrile rigor; and the chill was never felt without subsequent expectoration.

"From the beginning of autumn 1799, Mrs. Finch lived in the cow-house for about six months, with the exception of a few days."

After leaving the cow-house, Mrs. Finch made a short sea voyage, and then confined herself till March 1800 in a room artificially warmed; and we are happy to find, from a letter dated May the 10th, and inserted in the conclusion of the work, that she then was, with the exception of temporary spasmodic pains in the stomach, and difficulty of breathing, tolerably well.

The second case is less conclusive in its results. The patient had evidently confirmed phthisis. At first some benefit was occasioned by the cow-house; but in a short time the pulmonary symptoms became stationary, and a nervous complaint of long standing was aggravated in its symptoms by the circumstances to which the patient was exposed; so that after a few weeks she was removed from the cow-house, and the case soon ended fatally.

The third case is analogous in its termination. The patient had confirmed consumption. No change of symptoms took place in the cow-house on which rational hopes of recovery could be founded, and he was speedily removed.

The fourth case is more favourable. The patient had incipient phthisis. He remained three months in a cow-house: during this time his hectic symptoms gradually disappeared, and he rapidly gained strength and flesh. "Some cough and expectoration remained when he ventured back into common life." This was in April, and, according to the author, "too early a season." He continued, however, to improve in health, and now considers himself as a person with a delicate chest, and not an invalid.

The cases in which artificial warmth and medicine were employed at the same time, are, in general, very important. We particularly recommend those of Mr. Billingsley and Mrs. H. to the attention of our readers. In general, it would seem that artificial warmth is highly beneficial in pulmonary affections, and that it is capable of assisting the agency of digitalis; so that we cannot but consider this application of the practice as an highly interesting event, though the full extent of its utility can only be ascertained by new and varied trials.

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With regard to these considerations, we, perhaps, cannot better impress our readers, than by laying before them the author's observations on his first experiments. He says, "the friends of the consumptive will, I trust, find these examples particularly deserving of their notice. In most cases, the business of prescribing and swallowing medicines, whether necessary or not, goes on smoothly enough, except when it happens that the physician is counteracted by some member of the family—the vulgar deception of tossing doctor's stuff out at the window being rarely practised. But when new and troublesome measures are to be taken, no success can be expected where the friends of an invalid do not go hand in hand with his physician.

"It will strike the superficial, that in several of the preceding cases no complete cure was effected; and undoubtedly the reporter must sincerely lament that he was not throughout successful. The success he had in one instance, rendered his sense of disappointment in another more poignant. But when it is remembered that the situation of the parties, so alarming on account of the nature of the disease, was rendered altogether desperate by its degree, and by the failure of the most powerful remedies, the means of preserving the smallest proportion of lives will deserve to be accounted an acquisition to humanity."

And again: "the advantage to the patient from living in an artificially heated room at home, deserves to be compared with a residence in Portugal or Madeira. If invalids would go to Egypt, or Bengal, or the West Indies, I should prefer due warmth with freedom of motion to confinement. But the climate of Portugal is either so variable or cold, and that of Madeira in fact so little salutary to the phthisical, that I should have no hesitation, in my own case, in preferring the regular artificial heat that can so easily be commanded at home. Whether heat excited by the sun be not preferable to the artificial, was a scruple started by Mr. Billingsley. It has been answered by his own experience, as will be related below, as well as by that of others. The article of economy speaks for itself. The comforts of a Lisbon residence are pretty well understood; though whether at large in Portugal, or closetted in a cowhouse, the feelings of convalescence would render either situation supportable.

"The degree of benefit arising from artificial warmth, in these consumptive cases, cannot be assigned. It was occasionally evident enough, that a certain temperature was indispensable, as without it the patients became stationary or lost

 ground.

ground. Conversely it was proved in Mrs. Finch, that atmospheric air, merely heated, was inadequate to relief.

"The principle on which I conceive the cow-house vapours to have acted, is well understood in the treatment of ulcers; certain applications disposing them to heal. And what way is there, upon which we can depend, of making applications to pulmonary ulcers, but that which gases or vapours offer to us?

"I still presume that the presence of the cows is by no means essential; nor do I doubt, but that in some states of pulmonary ulceration these vapours will be hurtful. When they arose in great quantities from stirring the fermenting materials, they were found to be so. It will be a strong recommendation to the further trial of the power of these vapours, if my statement should convince a certain number of patients or practitioners, that upon them depends the sole benefit. Vessels containing the fermentable substances could easily be introduced into a warm apartment; the former as easily be regulated by covers, and the vessels removed entirely, the moment the exhalations appeared to disagree."

Dr. Beddoes introduces his observations on the power and agency of digitalis by a defence and explanation of a passage in his Essay on Consumption, which has been much commented upon; and which relates to the comparative efficacy of this substance in consumption, and of the Peruvian bark in ague.

On this subject he says, "within three years I have seen many scores of phthisical invalids from among the poorer classes. I have always had, close at hand, a number of opulent patients of the same description. Each class has, in fact, lain before me, almost as conveniently for comparison, as the objects of his attention lie before a scholar occupied in collating a set of manuscripts. In general, where I had all possible evidence of the existence of tubercles, the exhibition of digitalis has been perfectly successful. If I specify that it has succeeded in three such cases out of five, I believe I much underrate the proportion of favourable events. With regard to the poor, who apply for relief in sickness, there exists a perpetual cause of uncertainty. Their attendance slackens as their health improves; and they are apt to disappear upon complete recovery; nor is it always easy to find them out by inquiry. In the richer class I have found the proportion of fortunate cases more considerable than I have stated; and

where

where digitalis alone fails, success is sometimes obtained by helps, of which I shall speak before quitting the subject.

"When ulceration has succeeded to interior disorganization, the greater difficulty of cure has appeared to me very strongly marked. Why this should be, is easily comprehended from general analogy: its full illustration, by tracing the diversity of animal actions step by step, I relinquish to those who may think they understand the nature of phthisical ulceration, and the effect of the particular situation which the ulcers occupy. Entire failure has appeared to me, on the one hand, most frequent in the neediest poor; and on the other, in those females of higher life, who, from transmitted feebleness, and the want of air and exercise, of wholesome hunger and digestion, appear more like the shadows of human beings, than substantial compounds of flesh, blood, and bone. And as one means for the conciliation of contradictory testimonies, respecting the effect of digitalis in confirmed or ulcerated consumption, I adhere to the opinion expressed in the West-country Contributions, 1799, pp. 534—5: viz. that robustness of constitution is peculiarly favourable to the action of digitalis in this disease."

Three cases of pulmonary affection are detailed, in which digitalis produced evident benefit. The case of Dr. Briggs is well worthy of notice; it is accurately drawn up by that physician himself, and the disease was evidently incipient tubercular phthisis.

On the mode of exhibition of digitalis Dr. Beddoes observes, "when the mild exhibition of digitalis produces no good effect, and the patient is not greatly reduced, I have occasionally found it useful to administer it in nauseating or in sickening doses. In a few cases the purulent expectoration has been lessened at every sickness, and under the use of intermediate small doses has failed to return to its former quantity.

"I have very frequently employed digitalis externally; but never alone. I am not, therefore, able to speak with confidence of the effects of this manner of using it. In cases where the common mode fails, I purpose to try friction vigorously, and hope sometimes to succeed. I imagine some analogy of operation between sickness from digitalis and sickness from sailing. The persons, in whom I have seen consumption considerably mitigated, and the very few whom I have known perfectly cured, by a sea voyage, have not, any of them, belonged to the more puny division of the consumptive. And I apprehend delicate females, affected by this disease, rarely experience

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great relief from sea sickness. I do not, however, feel myself entitled to advance an opinion on this point. I merely offer a conjecture, principally wishing to excite the attention of observers."

And again; "when fox-glove is deficient in operation, I have found the conjunction of opium in large doses, of bitters and squills, powerful auxiliaries. I have often joined with it hyoscyamus and cicuta."

The following observations are of considerable importance: "when digitalis has failed altogether in incipient consumption, I have occasionally found calomel succeed in a few instances." And, "I have sometimes given the hydrargyrus cum creta, and sometimes the simple mercurial pill instead of calomel, without any variation in the effect. And I have of late often joined one or the other with digitalis.

"There is a state of confirmed consumption, in which, if an auxiliary to digitalis of given operation could be discovered, some lives would be saved. The state I allude to is of this nature. In some instances, when the fox-glove has removed the hectic fever, and greatly reduced the expectoration and cough, the decline shall become almost imperceptible; the patient frequently appearing chlorotic, but being really phthisical, as the event most commonly, and sometimes dissection has evinced. During this almost stationary period, the organs of sanguification appear inert; and the deficient production of blood (into which the chyle is probably converted in the lungs) sufficiently accounts for that consumption of the body which denominates the disorder. This defect of sanguification explains the emaciating process, when there is no excess of action either in the capillaries or other parts of the vascular system, nor any apparent drain, or else less evacuation than exists in cases where there is no emaciation. Those principles which enter into new combination during muscular contraction, being derived from the blood, and blood not being formed in sufficient quantity, the substance of the body will be wasted by the mere vital movements. Neither will the fat be replaced as fast as it is absorbed; and so of other parts. In phthisical children, where the attractions on which growth (or longitudinal extension of parts) depends, do not cease, though probably solids very different in constitution from the healthy solids are formed, it should seem that emaciation ought to go on with peculiar rapidity, if other circumstances were alike."

In his attempts to account for the "mode in which digitalis operates," the author seems to have adopted that theory which

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is known in this country by the name of *chemical physiology.* He says, "at present I can only enuntiate an opinion, reserving full discussion to a future occasion. To whatever organ medicinal application is made, I consider the applied substance as a chemical compound. The organs themselves I consider likewise as chemical compounds, extremely variable, and of a peculiar nature for the time being. We know that certain changes in those organic compounds, which are first affected, will produce successive changes in connected parts, till perhaps the whole frame undergoes a change in its composition, and consequently in its actions. Some effects of these changes will be manifest; others more obscure; and others not ascertainable by any of our present methods of observation.

"There is nothing in all this peculiar to the beings which we usually denominate organized. Alterations in any body will produce alterations in a series of adjacent bodies to an indefinite extent. The changes produced by the burning of a candle, may be traced far into the sublunary system; and by help of pretty close analogies, they may be pursued into a more remote region of the universe. In organized bodies, if secondary effects are more sudden or more sensible than in most others, this is owing to the close connexion of their members, and to the easily variable constitution of each member. By virtue of their connexion, the members of the galvanic piles, at present known, seem to influence one another as readily as the bodily organs; but being similarly constituted, there is presented no diversity but in the degree of operation."

Conceding to this opinion the merit of considerable ingenuity, we cannot, at the same time, allow it to contain an accurate generalization of the phenomena already known relating to organized nature.

The different branches of human knowledge can only be considered as connected expressions of facts following in their arrangement, either the order of nature, or strict and obvious analogies; and, by the common consent of philosophers, they have been distinguished from each other by appropriate names. The phenomena relating to mechanics have been supposed to be distinct from the phenomena of chemistry; and as yet it would be considered as rash to class the galvanic facts as simple chemical changes: why then should we, in direct contradiction to the adopted modes of nomenclature, attempt to identify the powers producing living action, which are, with regard to us, unknown, with the agencies of organic matter,

ter, which are obvious and ascertained? It is surely better to confess our total ignorance of the laws of life, than to form obscure generalizations founded upon loose analogies concerning them; as in the one case we give full liberty to the inventive powers of the human mind; but, in the other, we limit its exertions to a particular object, by holding up to view a theory which is most probably false, and concerning which it is nevertheless compelled to reason.

Indeed, after the first enuntiation, Dr. Beddoes himself seems to have been fully aware of the danger and difficulty of systematizing concerning the organized nature. He says, "again, we can scarce be said to have advanced a step in vital chemistry. We are not acquainted with the constitution of any one organ in any one of its conditions. We know nothing of the difference between the several conditions compatible with life. How, therefore, the recipient and the received body modify each other in the first instance, remains a perfect mystery. Nor are we better informed as to many of the consequences of the primary modifications. Of some, our senses may occasionally inform us; and would inform us of more, if they were more assiduously and advantageously applied. But we shall most grossly deceive ourselves, if we imagine that such observations as we at present take, can ever amount to a theory or systematical body of facts. They are, perhaps, always remote effects, and therefore, relatively to us, uncertain—the more remote, the more uncertain; because, of the parts progressively affected, if any one, unknown to the observer, be in a different state at different times, or in different persons, the effect that has previously taken place, and is again expected, may fail to appear. Our judgment, however, respecting the character of medical agents must abide by effects, thus remote and uncertain."

The experiments made by Mr. King, on the comparative action of opium and digitalis on cold-blooded animals, which follow these preliminary observations, were well contrived, and their results are curious and worthy of attention. The account of them will not admit of abridgment; and we must content ourselves with giving Dr. Beddoes's generalization of facts concerning the mode of operation of digitalis, which, in some measure, is founded upon them.

"1. Digitalis, in a certain dose, will increase the action of the arterial system.

"2. It will increase the digestive power of the stomach, when that is impaired.

"3. It will often induce sleep, like opium.

"4. Like opium, in an over dose it occasions languor and excessive sensibility, headach, dimness of vision, nausea, and bilious vomiting.

"5. It almost immediately produces great excitement in frogs, somewhat as opium does; and produces certain other effects, similar to those of opium."

The observations on the cure of scrophula contain an account of five cases, in which the muriate of lime, used in moderate doses, produced evidently beneficial effects. The motives which induced the author to administer it, and the peculiar mode of its administration, are detailed in the following paragraphs:

"In several foreign writers I found a medicine strongly recommended in scrophula. To my feelings these writers spoke the language of genuine observation; and I soon met with cases which resisted calomel, sponge, steel, bark, (tepid) sea-bathing, muriate of barytes, and all the other remedies which are more commonly in use among us. In the known qualities of the medicine, I found nothing at first sight objectionable. I was encouraged by a correspondent; and so I tried it, with what success I have now briefly to relate. This medicine is the muriatic acid, saturated with lime—the muriate of lime. I have employed no particular nicety in regulating the process by which it has been prepared. Muriatic acid, or spirit of salt, has been taken, such as the shops supply.

"I have given it to near an hundred patients, in various conditions of life. The dose has been from ten drops for young children, to two drachms for others, three or four times a day. A drachm, diluted with water, (and this is the way I have often ordered it,) I consider as a medium dose.

"There are very few of the common forms of scrophula in which I have not had successful experience of the muriate of lime. A few cases will exemplify its powers, and induce practitioners in medicine, when they want a more powerful remedy for scrophula, to have recourse to this."

The following observations on the use of remedies analogous to the muriate of lime conclude the connected part of the work:

"The use of the muriate of barytes in scrophula has been a subject of experiment for a number of years; and though aware that the history of that medicine will, previous to trial, throw some disfavour on the muriate of lime, I am not deterred from recommending it by that consideration. The combina-

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tions of the alkaline earths, and of the alkalis with different acids, will readily occur as substitutes. Experiments on the effects of strontian, in comparison with barytes, shew that the salts of strontian may be very safely tried.

"The experience of old medical writers gives me some faith in the salts, which they so much recommended as deobstruents in affections of the lower belly. My faith is strengthened by another consideration. As purges they probably produce an action, which is propagated to the mesenteric glands: given in a dose too small to produce any cathartic effect, they will produce an action or excitement, which can be long supported, as being followed by no debility—an action which may be to purging, what the cordial operation of fermented liquors is to intoxication; and by this the glands may be brought to a healthy state.

"It is certainly not by purging that muriate of lime cures tabes mesenterica, or any other scrophulous affection. I have scarce ever been obliged to lessen the dose on this account, but often to give aperients under its use."

The Appendix contains:

1. "Cases and Observations on the medicinal Efficacy of Digitalis purpurea in Phthisis pulmonalis, with Speculations on its *modus operandi*, and on analogous Remedies. By Dr. Kinglake."

2. "Efficacy of the internal Use of the Oleum Hyoscyami in Hæmoptöe. By Professor Horles."

3. "On the Use of certain external Applications in Consumption:" and

4. "Conclusion." By the author.

The substance of the first of these papers we recollect to have seen in the Medical and Physical Journal. The cases are well described, and demonstrative of the efficacy of digitalis in certain catarrhal affections, and in incipient phthisis. Dr. Kinglake's reasonings on the mode of operation of the foxglove are very analogous to those of Dr. Beddoes, though given in a different and more obscure language.

Appendix, N° 3, is important; three cases are detailed, in which the application of the caustic to external parts of the chest produced evident relief.

The conclusion contains some liberal and philosophical observations on the general importance of the subjects discussed in the work, and apologizes for the manner in which they are treated. We shall conclude our review with the following extract from it:

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"As intellectual impediments to the enjoyment of health, and the prolongation of life, are progressively removed by well-adapted popular writings, the mortality from scrophula and consumption in families, sufficiently supplied with food, fuel, and clothing, will immensely decrease. We have correctives adequate to the evil; and it is but to use them seasonably.

"The hope, that I might be essentially contributing to extend the knowledge of these precious remedies, and of the season for using them, has supported me against fatigue and indisposition, whilst I was arranging the tract, to which I now put the last hand. What I found principally irksome was the repetition of the common-place diagnostics of phthisical disease. In truth, to frame or follow many descriptions of cases according to this model, can generate none but disagreeable feelings in that mind, which seeks to penetrate into the interior of the animal economy, and to detect the hidden connexion of its movements. But however vicious may be the style and manner of our shallow, vulgar nosography, I did not think this the place for attempting corrections. The necessities of the sick and the sickening are urgent: so, therefore, must be those of the medical attendants. And, though an account of stages and roads, can afford no satisfaction to the inquirer into the condition of a people and its causes, it may much expedite the traveller, whom business impels in the same direction."

ART. VII. *Annals of Medicine for the Year* 1800; *exhibiting a concise View of the latest and most important Discoveries in Medicine and medical Philosophy.* By ANDREW DUNCAN, Sen. M.D. and ANDREW DUNCAN, Jun. M.D. Fellows of the Royal College of Physicians, Edinburgh. Vol. V. Octavo. 567 pages. ROBINSONS, London. 1801. Price 9*s*.

THIS useful compendium of medical discoveries has now been regularly published by Dr. Duncan for twenty-five years: the first twenty volumes are well known to many of our readers by the title of Medical Commentaries, and to the new series, in which he is assisted by his son, he gives the name of Annals. To render this publication more useful as an index to physicians and philosophers, the present volume is concluded with a general alphabetical table of contents of the five volumes of Annals, which comprise what the authors term the first lustrum. With the Annals of Medicine for 1801

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they mean to begin a new lustrum, but not a new series of volumes. It is their intention, that every future lustrum shall be concluded with a similar general alphabetical table of contents; thus every five volumes will form, as it were, a complete work.

The First Part, as usual, contains an analysis of books: this Part occupies three hundred and twelve pages, and presents an account of several of the most curious particulars relative to galvanism. Among these is, Epistola ad Societatem Medicam quæ Edinburgi est: a C. C. Creve, M. D. et Prof. Moguntino.—As this is one of the earliest dissertations on the subject, and in which its industrious author has, in several particulars, anticipated the more recent experimenters, we shall transcribe the most interesting parts of Dr. Duncan's account of it.

In the year 1793, the Royal Medical Society of Edinburgh proposed a series of prize questions, with the view of exciting philosophers to undertake the investigation of its nature; but as they received no satisfactory answer to them, they repeated them in 1795; and in 1797 they received a Latin dissertation, with the motto "Ultra posse nemo tenetur," which appeared, however, to have been sent some years before. In 1798 the prize was adjudged to it, and it was found to be written by Professor Creve of Mainz.

"To his own experiments, he premises a history of the discoveries of Galvani, Valli, Gentili, Volta, Behrends, Fowler, Robinson, Corradori, and Pfaff. He observes, that the experiment of producing the galvanic taste by the application of two metals to the tongue, was described by Sulzer, in his Théorie des Plaisirs, published in 1767.

"Of his own experiments, many are not original, and many more have been since repeated by others. He found, that the muscles of every class of animals are subject to the galvanic stimulus, but that there was a great difference with regard to the violence and duration of the convulsions; which last property, the amphibiæ and cold-blooded animals enjoyed in the highest degree. His next experiments relate to the modes of applying the metals, the duration of the excitability in different animals, and the parts to which the stimulus is applied. The pupil in the eye of a calf did not contract on galvanising the optic nerve, nor did living arteries beat more quickly on the direct application of the metals to them. By galvanisation, the peristaltic motion of the stomach was increased, and the motion of the heart, if the metals were applied immediately

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to its substance, but not at all if applied only to the nerves called cardiac.

"He next examines the effects of galvanising animals deprived of life in various ways. Those which died a natural death, even the most lingering, retained their excitability.

"When frogs were killed by passing an electric shock through their head, they continued excitable; but, when the shock was passed through the whole length of the body from the head to the tail, they were insensible both to the stimulus of galvanism and of electricity. In like manner, the lower extremities cut from a living frog, were deprived of their excitability, by passing a shock from the pelvis to the foot.

"Asphyxia produced by submersion under water, or by immersion in impure carbonic acid gas, or in nitrous gas, or in azotic gas, did not diminish the excitability.

"From his experiments with animals poisoned by the essential oil of the skins of bitter almonds, and by opium, he concludes, that the irritability of the muscles was not changed, but that the nervous power was debilitated.

"The muscles of animals bled to death continued to be excitable: but the leg of a frog, in which a mortal sphacelus was produced by tying the popliteal nerve, was wholly inirritable, and the leg of a man amputated on account of gangrene, very slightly excitable.

"Professor Creve next proceeds to detail experiments, shewing that the hand of the operator is not essential to the production of the galvanic phenomena; that galvanism may be intercepted by ligatures; and that it does not act against the course of the nerves.

"The manner of applying this stimulus to the organs of sense is next described. Zinc, tin, lead, iron, charcoal of wood, and antimony, produced an acidulous taste; but gold, silver, copper, and platina, an austere and disagreeable sensation.

"In an exhausted receiver, the convulsions were produced. Under water, oils, and other fluids, they also occurred; but under water, the vicinity of the point where the nervous coating was touched by the exciter, to the nerve, had great influence; whereas, on the contrary, in the air it had none. If the coated nerve, and the muscles of the leg stripped of their skin, were immersed in separate vessels of water, convulsions were produced when one end of the exciter was applied to the coating of the nerve, and the other merely touched the water in which the leg was immersed; but the muscles remained at rest when

the exciter only touched the water in which the nerve lay, although the other end was in contact with the muscles themselves. When the muscle and nerve were disposed as in the last experiment, except that the nerve was without coating, and that one end of the exciter was of zinc and the other of silver, convulsions ensued, on touching the water in both glasses, without any actual contact of the parts. One leg of a frog laid in water at 54°, lost its irritability in six hours, while the other, laid on a glass plate, retained it for forty.

"In a receiver with nitrous gas, the muscles of a frog remained motionless, though affected with spasm, and in an hour and a half were perfectly pale and inexcitable. In hydrogen gas they were convulsed. In carbonic acid gas they were at first convulsed, but, by exposure to it, gradually lost their irritability, which again gradually returned on exposure to the atmosphere. In oxygen gas the leg of a frog retained its irritability for 106 hours, though the other in carbonic acid gas was exhausted in four.

"Professor Creve notices, that there are numerous sources of error in investigating the powers of the different metals with regard to this agency; but he has constructed a table of the results of his experiments, which were instituted in the following manner: He fixed the prepared pelvis and lower extremities of a frog on a table, so that the leg and foot hung freely over it. To the foot he affixed a loop, by which he suspended the weights he used to measure the violence of the convulsions. The nerve rested upon one metal, to which he has given the name of conductor of heat; the other, bent in the form of an arc, he has termed the exciter of oxygen. With it he touched the nerve and conductor of heat at the same time, and by affixing weights to the noose at the foot, endeavoured to ascertain how many half ounces it required to overcome the convulsive efforts of the leg.

"After explaining his opinions of the laws of irritability, Professor Creve proceeds to answer more immediately the questions proposed.

"1. Are the phenomena discovered by Galvani referable to electricity, or to any of the hitherto known laws of nature?

"The phenomena of galvanism are the result of a stimulus acting on the excitability. This stimulus may be supposed to be either an electrical or magnetic fluid, flowing from the nerves into the metals, or from the metals into the nerves; or mechanical, arising from the elasticity of the metals or from friction; or chemical, from the condition of the caloric being changed

changed by the application of the metals, or from the abstraction of oxygen from the muscles or nerves by the metals.

"Our author endeavours to shew, that the galvanic stimulus is not referable to the classes of electrical or mechanical stimulus, and supports the idea of its being of a chemical nature. His theory is as follows:

"The caloric and oxygen, which exist partly in the muscles, and partly in the nerves, by the application of the metals are called into action, and pass from the animal parts into the metals, on which the muscles are excited to contraction. It is necessary that the metals applied be of different kinds. This difference chiefly consists in the affinity or attraction which one of them has for oxygen, and in the power the other has of abstracting caloric from the animal matters, and imparting it in due proportion to the exciter of oxygen. Therefore, the one metal, the conductor of heat, abstracts caloric from the nerve or muscle, and conducts it to the other metal, the exciter of oxygen thereby exciting and increasing its capacity of attracting oxygen from the nerve or muscle; and thus by the efflux and passage of these two elements, the nerves and muscles are violently stimulated.

"To support this theory, he adduces proofs of the existence of caloric and oxygen in animal matters. By exposure to oxygen gas, muscles are rendered more florid, become more irritable, and retain their irritability longer, than in the atmosphere. On the contrary, they lose their colour and irritability more rapidly, by being immersed in hydrogen, nitrous or carbonic acid gas, or water.

"As exciters of oxygen, those metals are most active which are most easily oxydated at a low temperature. Manganese, zinc, tin, lead, iron, copper, antimony,—is perhaps the order of their fitness for this purpose. The two first are well known to be the most easily oxydated of all metals, and are at the same time the most active agents in galvanism. To the exciters of oxygen, pure charcoal is the only other substance to be referred, and it also is readily oxydated. Besides, if these substances be deprived of their attraction for oxygen, by being saturated with it, or united with acids or other bodies, they become inert with regard to the galvanic experiment. Applied to the tongue, along with a conductor of heat, they all excite an acid taste, very different from that of the conductor. Muscles which are deoxydated, are not convulsed on the application of the metals. Professor Creve did not find the weight

weight of the metals absolutely increased, by being long employed in galvanisation; but their surfaces were tarnished.

"Many facts shew, that in these experiments, caloric is also abstracted from the animal matters; which caloric passes through its conductor into the exciter of oxygen, of which the capacity in these circumstances is increased. But we actually find, that those metals, which are most efficacious in exciting galvanism, when connected with exciters of oxygen, are those which most readily conduct caloric,—silver, gold, copper, tin, platina, steel, iron, lead. In like manner, by depriving these of the property of conducting caloric, you deprive them of their fitness for the galvanic experiment. The taste produced by them is bitter and austere; and it is remarkable, that a taste exactly similar is produced, by applying a piece of ice and zinc at the same time to the tongue. On these principles, Professor Creve proceeds to explain the various phenomena of galvanism.

"II. If they are to be referred to a property peculiar to animals, what are the parts most concerned in their production, the means by which they can be rendered most obvious to the senses, and the general laws by which they seem to be regulated?

"According to Professor Creve's theory, they depend partly on the animal matters, and partly on the metallic. The means of rendering them obvious to the senses, he has also described, and has attempted to systematize the laws by which they are regulated.

"*a.* With regard to the application of the metals.

"1. The phenomena occur if two metals of different species in mutual and direct contact be applied to a nerve.

"2. If they be applied to the muscles stripped of their skin.

"3. If the one be applied to the nerve, and the other to the muscles.

"4. If the metals be applied to water, milk, vinegar, &c. in contact with the animal matters, or if the communication be made by the hand of the experimenter.

"5. The metals must be in direct contact with each other.

"*b.* With regard to the metals.

"1. The metals must be in the state of regulus.

"2. Charcoal is the only other body possessing the same powers.

"3. The

"3. The efficacy of the metals depends on their specific difference.

"*c.* With regard to the nerves and muscles.

"1. The nerves must be possessed of sensibility.

"2. The muscles, of irritability.

"3. The muscles may be either voluntary or involuntary.

"4. Galvanism acts only downwards.

"5. It is interrupted by ligatures applied to the nerves.

"6. It acts longer and more violently, the more durable the irritability of the part is.

"7. It acts longer and most violently in an oxygenous medium.

"8. It loses its action in a deoxygenating medium.

"III. If to a property belonging to a metallic or other inanimate substance, what are those substances, their comparative powers, and the circumstances which modify their action?

"The metals and pure charcoal of wood are the only substances possessing this property, and they are deprived of it by being deprived of their attraction for oxygen or their power of conducting caloric. Their comparative efficacy may be seen from the table already inserted.

"IV. Can any similar phenomena be exhibited in vegetables, especially such as have been supposed to be endued with irritability?

"The most irritable vegetables, the mimosa pudica, &c. were totally insensible of its influence.

"Professor Creve concludes his elaborate essay with some observations on the advantages resulting to science from this discovery. He proposes to make use of galvanism, to ascertain whether in asphyxia any spark of life remains; and deduces, from our acquaintance with its effects, a rule to be observed in surgical operations; namely, that whenever it is necessary to apply directly to the flesh two metallic instruments in contact with each other, they should invariably be formed of the same metal. To the former of these subjects Professor Creve has dedicated a separate work, 'Of the galvanic Stimulus, as a newly discovered and infallible Test of real Death.' Octavo. Leipsic, 1796."

The second section of the Annals of Medicine contains original medical observations communicated to the authors. Of this, and the third section, we shall give an analysis in our next Number.

FOREIGN LITERATURE.

ART. VIII. *Traité medico-philosophique, &c.* i. e. *A medico-philosophical Treatise on mental Derangement, or Mania.* By P. PINEL, Professor in the Medical School of Paris, chief Physician of the National Hospital for Women, and Member of several learned Societies. Paris, sold by RICHARD, CAILLE, and RAVIER.

THIS work, on the derangements incident to the human intellect, and to the different propensities which may become the principles of human action, is the result of very great experience, aided by profound study of the functions exercised in a state of perfect health.

"To give the greater importance to the history of mental derangement, to distinguish accurately its different species, in order to avoid useless and precarious experiments; to bring under precise rules the direction of public and private mad-houses, it being impossible to treat such patients with success in their own families; to enforce the necessity of local arrangements for the methodical division of them into different classes; to place in a respectable point of view the enlightened and philanthropic attention necessary for maintaining the strictest order in this service; to point out the simple remedies which experience seems to recommend, the proper precautions, the critical changes of the disease; in a word, to learn the propriety of reserving for extreme cases the use of certain active remedies, which, in different circumstances, would be superfluous, hurtful, or dangerous:"

Such is the task which Professor Pinel has undertaken, and which, indeed, he has accomplished in a manner that ranks him far above all former writers on this subject.

Into his Introduction he has condensed an account of the most important performances on mania, from the time of Hippocrates to the present day. Thus he marks with precision the point from which he sets out, and gives us the means of easily judging, whether or not he has been usefully employed in doing more than the authors who preceded him.

He begins his work with an historical explanation of intermittent mania; he points out the causes and the seasons which influence the returns of the fits; he proves that some species of the disease depend not on the seasons; and that its nature varies with the constitution of the individual, and not according to the causes which have produced the mania; he traces,

traces, with much precision, an outline of the prognostics of the fits, and describes, with equal exactness, the alterations of the moral affections, and the different injuries of the intellectual faculties during their continuance; successively directing his attention to the degree of physical and moral energy which characterizes them, the debility consequent on their decline, and the extremes of hunger and cold which the maniacs are able to undergo, &c.

The author, convinced by a multitude of observations, that moral management might frequently effect the cure of maniacs, proceeds, in the second section, to the principles of that kind of treatment. His chief object is the indication of the circumstances which render some alteration in it advisable. Sometimes energetic language must be employed; at other times the imagination should be strongly affected. It is frequently necessary to intimidate the patients, but without any act of violence. Their attendants, however, constantly acting on maxims of gentleness and philanthropy, should know how to work on the predominating ideas of the maniacs, according to their different characters. Those attendants should possess an assemblage of physical and moral qualities seldom united in the same person, and of which our author gives an animated sketch in the character of C. Pusson, superintendant of the hospital for lunatics in the Bicetre.

The third section is confined to anatomical researches, on the vicious conformation of the skulls of maniacs; yet though he has conducted those researches with the most scrupulous care, he is very cautious in drawing conclusions concerning the proximate causes of mania. In most cases there was no defect of conformation, which may not be observed in persons enjoying the full use of their reason. Among the skulls which the author measured, he found two which were less capacious than ordinary, and he has given figures of them. The maniacs to whom they belonged had suffered an almost complete extinction of their intellectual faculties.

In the fourth section, Professor Pinel divides mental derangement into five distinct kinds. "Sometimes the imagination or perception undergoes a manifest derangement without any internal emotion, *(melancholy, or an exclusive delirium on one object.)* Sometimes the functions of the intellect remain unimpaired, and the patient is actuated by a turbulent and furious activity, *(mania without delirium.)* Many maniacs join a periodical or continued delirium to acts of extra-

vagance and fury, *(mania with delirium.)* We sometimes observe a state of dementation, a kind of moral disorganization, in which the ideas and internal emotions have no relation to the impressions of the external objects, but succeed each other, are interchanged, and extinguished in a disorderly manner, without leaving any vestiges behind them, *(dementation, or abolition of thought.)* The case is still worse, when there is a sort of obliteration of thought, a privation more or less absolute of ideas and emotions, or even an annihilation more or less complete of the understanding, *(idiotism, or an obliteration of the affections and intellectual functions.)*"

Professor Pinel proves, by a great number of examples, that his division is founded on characters as essential and immutable as the laws on which they depend. Without this division there is nothing but confusion in the history of mania, and we can only grope our way in conducting the treatment of the disease, which, with the aid of this division, becomes much easy; for thus we can with more certainty predict what will be the issue of the malady, and in the choice of the means of cure, we experience none of that fluctuation which is generally observed in those who have no such guide. The author never loses sight of his division, either in laying down the rules of management which ought to be established in madhouses (section fifth,) or in describing the medical treatment of the patients (section sixth.) These last parts are written in the same masterly manner with the preceding ones. Professor Pinel, who is rich in observation, always takes care to cite a sufficient number of cases to support his precepts. His style (according to the French reviewer, whose account we are translating) is always concise, clear, and nervous.

This work will be read with as much satisfaction by the ideologist as by the physician, for the author writes at once like a skilful physician and a profound metaphysician. We take the liberty to conclude this analysis in his own words: "The fundamental principles propounded in this Treatise will suffice to support an establishment superior to any of the kind possessed by the most enlightened nations: and ought we not to wish for a permanent government, which may direct all its views towards the great objects of public utility?"

[*L'Esprit des Journaux, May* 1801, *p.* 59.

ART.

ART. IX. *Pharmacopie des Pauvres; ou Formale des Medicamens les plus usuels pour le Traitement des Maladies du Peuple.* i. e. *The Poor's Pharmacopœia; or the Forms of the most useful Medicines for the Treatment of the Disorders of the common People.* By JADELOT. New Edition. Octavo. 1 liv. 80 cent.

THIS volume points out the virtues of the various medicines, the manner of using them, and the disorders for which they are remedies. It will be useful in hospitals, houses of charity, &c. [*Jour. Gen. de le Lit. Franç.*

ART. X. *De la Petite Verole par la Methode naturelle, on des Moyens de rendre cette Maladie plus souvent bénigne, et de s'en preserver, sans le Secours de l'Inoculation; avec un Tableau analytique, où l'on expose l'Origine, la Nature, et la Cause des differentes Espêces de Petites-verole, &c.* Par L. P. COLLINET. i. e. *Of the Small-pox by the natural Method, and of the Means of rendering that Disorder more frequently benign; and of preserving Persons against it without the Aid of Inoculation; with an analytical Table, in which the Origin, Nature, and Causes of the different Species of the Small-pox are explained.* By J. P. COLLINET. Duodecimo.

THE author's intention is to encourage those persons who have not been attacked by this disorder. He has been appointed in France one of the officers to inquire into the deaths in the eleventh *arrondisement* (district.) A long time ago he presented a plan to his colleagues, for ascertaining periodically an account of all the disorders which have preceded death, and to present an analysis thereof in one point of view. The commission has adopted his views, and has submitted them to the approbation of the magistrates, with an invitation to communicate them to the officers of health nominated for the same purpose in the other districts of Paris. If, as they request, this plan is followed, the officers of health in all the districts are to assemble, on a fixed day in every month, to digest a general account of all the deaths in Paris.

[*Journ. de la Lit. Franç.*

ART.

ART. XI. *Traité elementaire de Mineralogie suivant les Principes de Werner, redigé d'apres plusieurs Ouvrages Allemands, augmenté des Descouvertes les plus modernes, et accompagné des Notes pour accorder la Nomenclature avec cette des autres Mineralogistes Français et etrangers.* Par A. J. M. BROCHANT. i. e. *An elementary Treatise on Mineralogy, according to the Principles of Werner; selected from several German Works, augmented by the most modern Discoveries, and accompanied with Notes to make the Nomenclature agree with that of other French and foreign Mineralogists.* By A. J. M. BROCHANT. Vol. I. 644 pages, with 18 tables and 1 plate.

THE works of M. Werner on mineralogy have been translated into almost every language; his principles and his nomenclature are at present generally adopted in Germany with some small modifications. In England, Kirwan has, in his Mineralogy, published 1794, followed the descriptive method of Werner, only varying the nomenclature a little. In Italy, the Chevalier Napione has closely pursued both the method and nomenclature of his master, and has contributed to make them known in that country by his Elements of Mineralogy, printed at Turin in 1797. Throughout the North this method has been approved of; and, if it has not had the same favour in France, the reason is, that they have fallen into a mistake with respect to his intention, in his Treatise on the exterior Characters of Minerals; and that they have expected distinctive instead of descriptive characters. His nomenclature has been hitherto known in France only as tables, without any explanation; it was, therefore, a praiseworthy and useful undertaking, to present the system and nomenclature of this learned mineralogist in one point of view.

The translator, a pupil of Citizen Hauy, for want of a complete treatise on mineralogy, which is still expected from Werner, has consulted all the works which have appeared on this new system, preserving what has an immediate connexion with this, and retrenching, or throwing into notes, all that has been added or changed by the commentators. He has enriched his translation by a description of the species of mineral lately discovered in France, with a view to make this treatise keep pace with the new discoveries. The description of simple and mixed minerals, and their characters, is preceded by their classification, but ought rather to be followed by it. These characters are distinguished into *simple, exterior, chemical,*

 physical,

physical, and *empirical*; Werner's classification is founded on the exterior characters and their chemical composition. All these minerals are ranged in four classes, and subdivided into genera and species. The four classes are *earths* and *stones*, *salts*, *combustibles*, *metals*. The classes and genera are arranged according to the chemical principle which predominates in them; and the whole classification is presented in the form of a table at the end of the exterior characters. The mixed minerals, or those composed of simple minerals, are considered as rocks, or mineral masses of great extent, constituting mountains or plains on the surface, and in the interior of the earth. These rocks are divided into five classes, viz. rocks, *primitive*, by *transition*, *stratiform*, by *alluvion*, *volcanic*; the particulars of which must be seen in the work itself.

The translation is correctly done, and enlarged with two notices; one of the works of mineralogy, from whence Werner's principles have been selected for the formation of this Treatise; and the other, of the principal works of mineralogy which are referred to therein.

[*Journ. Gen. de la Lit. Etrang.*

ART. XII. *Bibliotheca Ophthalmica, in qua Scripta ad Morbos Oculorum facientia a Rerum Initiis usque ad Finem Anni MDCCXCVII. breviter recensentur*, Auctore G. JOSEPHO BEER, M.D. et Ophthalmiatro Vindobonensi. 1799. Tomus I. Scripta de Morbis Oculorum externis continens. Tomus II. Scripta de Morbis Oculorum externis continens. Tomus III. Scripta de Morbis Oculorum internis continens. Quarto. SCAUMBERG and Co. Vienna. 1799.

IN the Preface to the first volume of this work, which is written in the German language, and has likewise a German title, *Repertorium aller Schriften*, &c. the author gives us an account of the origin and arrangement; and in the Introduction a short history of the diseases of the eye, which, however, is copied from Haller's "Bibliotheca chirurgica," here and there interwoven with gross errors; and instead of a history, a defective catalogue of the names of ancient physicians, who had either written on the diseases of the eye, or from whom we still possess recipes for the composition of eye-medicines; Paulus Ægineta and Abul-Casem are not even mentioned in this history; and from what he does say, it is impossible for the reader to form an idea of what the science

gained

gained by their labours. On the other hand, a number of singular mistakes occur, arising from our author's having misunderstood and mistranslated Haller.

The Repertory itself, as the author assures us, contains the fruits of ten years study. Tried friends, who, on other occasions, had not flattered him, had believed that this work would prove materially useful to the world. It was his intention, that it should contain all that has been written on the diseases of the eyes down to the present times, and that every thing should be well weighed in the scale of experience. The work is arranged systematically. Under each head stand the authors, the titles of their books, short critiques of them extracted from Reviews, &c. and then an original critique by himself, in which he says it will be impossible to discover any plagiarism; but where he could not obtain the works themselves, he was obliged to be content with the reviews of them by others; and from the Medico-chirurgical Journal of Salzburg he likewise copied some articles verbatim.

Of the completeness of this work we cannot yet judge, as it is not finished, and many things may be, though certainly very awkwardly, afterwards given in supplements. From the too great detail in the systematical arrangement arises the inconvenience, that many authors who have written on very similar diseases, as, for instance, Daviel, &c. are frequently introduced, and that repetitions become unavoidable. But this regular order is attended to only with respect to the diseases, or rather heads, under which he has introduced his authors; for besides this, no trace of order is to be found in the whole work. If he had arranged the authors in a chronological order, and, as he promises in his preface, given a concise account of what was peculiar to each, he would have enabled his readers, not only to become acquainted with the writers on the diseases of the eye, but likewise to take a view of the progress in the knowledge and mode of cure of each disease. But the authors are jumbled together in a strange confusion, just, probably, as they occurred to him, without any regard to the time in which they flourished. As far as Haller's "Bibliotheca chirurgica" goes, our author has copied verbatim from it, but with so many blunders and omissions of necessary notices, that even the *Addenda* in the second volume seem to have been entirely neglected.

The critiques on modern authors are borrowed from Reviews and critical journals; but he does not always quote his authorities,

rities, and it is impossible to guess from what source some of the critiques are derived. His own extracts are very copious, contain much extraneous matter, and fill whole sheets; as for instance, the extracts from Kortum on the Diseases of the Eye, and from Petit on the Fistula Lachrymalis. In these extracts many things frequently occur which have no connexion with the main object of his work; attacks upon several men of merit, declamations on the neglect and degradation of surgery, &c. Our author likewise delivers his opinion on some celebrated physicians yet living in Vienna, with a freedom which will not be approved of by every reader. In these discussions, however, we meet with many practical observations on various diseases of the eye, which are worthy the attention of the medical student, and which evince that our author is deserving of the reputation he enjoys as an able and experienced oculist, although, in the execution of his Bibliotheca Ophthalmica, he has not done enough to satisfy the just demands of even the most indulgent and moderate reader.

[*From the Jena Review.*

Art. XIII. *Archiv für medicinische Länderkunde:* i. e. *Archive for medical Geography.* Vol. I. N° I. Octavo. 126 pages. Published by Sinner, Coburg and Leipzig. 1800.

The anonymous editor intends to collect in this publication articles relating to medical topography and geography; and it will readily be allowed, that the undertaking is deserving of commendation; medical geography being still too much neglected by most practitioners, though, in many cases, a knowledge thereof be highly useful, and even indispensably necessary. How many invalids are radically cured merely by a journey into a certain climate, by the use of certain baths, &c. and how many, on the contrary, fall thereby sacrifices to the ignorance of their physician! We are sorry, however, that we cannot express ourselves equally satisfied with the manner in which the author has executed his design: he says nothing of the comparative relation of medical geography to the other branches of the science of medicine; nor does he even clearly develope the great utility of it. The whole first number consists only of compilations from well-known books. The following are the contents: I. Clausthal, from Lentin.—II. St. Andreas-berg in the Harz, from Klinge.—III. Lauterbach and

and the Territory of Riedesel, from Thillenius.—IV. Ilmenau. —V. Gräfenthal, from Winkler.—VI. Hof, from Jördens.—VII. Weimar, from Hufeland.—VIII. The general Hospital at Bamberg.

It would have added much to the value of his work, if the compiler had quoted the authors from whom he derived his materials, and added an index and table of contents.

[*From the Jena Review.*

Art. XIV. *Elemens de Pharmacie fondé sur les Principes de la Chimie moderne.* Par F. Carbonnel, Pharmacier-botaniste, de la Ville de Barcelone; Professeur de Philosophie et de Medecine, &c. Traduit de l'original Latin par P. Poncet, Medecin. A Paris. Mequignon l'aîne. An 8. Octavo. 180 pages. Prix, broché, 2 fr. 50 cent. et port franc. 3 fr. 25 cent.

The Elements of Pharmacy, by Carbonnel, have received the approbation of learned professional men; and C. Poncet has done an acceptable service by translating it into French. He has retained the Latin names of natural substances, and added the common ones. His translation proves, that he is well acquainted with the subject of his author.

[*Mag. Encycl. Floreal, An* 9.

Art. XV. *Aufsätze über verchiedene Gegenstände der Arzneilehre:* i. e. *Memoirs on different Subjects of Medicine.* By J. H. Brefeld. Octavo. Osnabrug.

Many observations contained in this work merit particular attention; among which are those on the effects of mercurial remedies; on the radical cure of the tape-worm, *ver solitaire;* on the gastric acid; on the effects of oily remedies in gouty complaints; on the use of bathing the stomach in cold water in dysenteries; on the effect of camphor in the same disorder; on the effects of hot water, &c.

[*Journ. de la Lit. Etrang.*

Art.

Art. XVI. *De la Fievre en general, de la Rage, de la Fievre jaune et de la Peste, et de Traitement de ces Maladies d'après une Méthode nouvellement decouverte.* Par G. C. Reich. i. e. *On Fever in general, on Madness, the yellow Fever and the Plague, and of the Treatment of those Disorders by a Method newly discovered.* By G. C. Reich. Translated from the German by J. N. E. de Bok. Duodecimo. Metz. 1 livre.

M. REICH, some time since, announced the discovery of a method of curing all kinds of fevers, madness, the yellow fever, and the plague. M. de Hardenberg, the King of Prussia's minister in the county of Anspach, ordered him to repair to Berlin, to make experiments on his theory in the hospitals of that capital, and under the inspection of the Royal College of Medicine. The result was so favourable, that the King of Prussia thought fit to purchase the secret of Dr. Reich, and ordered the College to make it public by printing.

Dr. Reich's theory and method of treatment are here given in eighty-eight aphorisms, or paragraphs, in a manner clear and intelligible to every one. He lays it down as a principle, "that fevers are produced by destruction of the equilibrium between the oxygen and the other principles which enter into the composition of the human body; and that the fever cannot be cured until they can introduce, or restore equally throughout the body, the quantity of oxygen necessary to establish the equilibrium between the different constituent parts; and that hence it follows, that the acids, and particularly the mineral acids, are more adapted to the cure of fever than any other remedies, and which have hitherto been employed in an empirical manner."

The translation is clear, and has been well done.

[*Jour. Gen. de le Lit. Franç.*

Art. XVII. *Selectus Instrumentorum chirurgicorum in Usum Discentium et Practicorum, Tabulis exaratus. Cum Usus Declaratione.* i. e. *A Collection of Instruments of Surgery used by Pupils and Practitioners, with a Description of their Uses.* Edidit Th. Knaur. 68 pages. Folio, with 25 plates. Vienna.

THE author, professor of surgery and midwifery at Leopol in Gallicia, was employed by the Emperor Joseph the Second, to attend to the instruction of young surgeons, and to contri-

 bute,

bute, as much as possible, to the perfection of his art in that province. He observed, that most of the surgeons were not only deficient in the information necessary for their profession, but even in the most simple instruments, and those most indispensable in certain operations. This suggested to his mind the idea of publishing this collection, and to give such a particular and exact representation of these instruments, as would enable a good workman to fabricate them. Among these instruments of surgery, he has preserved those which have been approved of by experience, without attempting to replace them by new ones, whose operation was not so certain, and which would only enlarge the surgeon's apparatus. Most of these instruments are represented of their exact size and without ornaments, so that the simplicity of their construction might be more apparent. This was the more necessary, as in Gallicia there are scarcely any working cutlers, and the instruments of surgery brought by the Jewish traders are not only of a bad quality, but very dear. The plates are accompanied by a clear and perspicuous description in the Latin and German languages; for the surgeons of that country being for the most part Polanders or Hungarians, are acquainted with the Latin language, which is very common among those people. The author has preserved the German, to make his work useful to his countrymen, and also to render it equally serviceable to foreigners. [*Journ. de la Lit. Etrang.*

MEDICAL INTELLIGENCE.

[Three or four pages of miscellaneous information, similar to this, will be given every Number.]

Art. 18. *University of Pavia.*

IT appears from a letter of U. P. Salmon, Physician to the French army in Italy, addressed to Mascagni, of the university of Sienna, and lately published, that the Cisalpine Government has lately proclaimed at Pavia the re-establishment of the schools, and that public instruction is proceeding there with great activity. Notwithstanding the almost irreparable losses which Pavia sustained last year by the death of the illustrious Spallanzani, of Barletti, of Presciani, and of the poetical geometer Mascheroni, and exclusive of those caused by the absence of Moschati, of Gregory Fontana, and the disgrace of Carminati, the university still retains that air of splendour

splendour which rendered it formerly one of the most brilliant in Europe. The university is divided into three faculties—philosophy, medicine, and law. In the faculty of medicine, the Professor is the Ex-consul of Rome, Panazzi. Pathology is taught by Dr. Raggi. Dr. Panazzi supplies the part of Moschati in the theoretico-practical, as well as in the clinical part of medicine. Legal medicine, and the police of medicine, are the object of another course given by Raggi. The school of chemistry is maintained with distinction by Brugnatelli. Professor Scarpa continues to demonstrate anatomy in the university, and to perform the clinical part of surgery in the hospital of the city. The students flock in crowds to both the courses. Young Jacobi, nephew of Scarpi, has obtained, under the title of Repititor, the chair of comparative anatomy and physiology, vacant by the premature death of Presciani. The institutes of midwifery and surgery enter into the lectures of Professor Nessi.

Art. 19. *Cow-pock Inoculation at Paris.*

Citizens Alibert, Du Prest, Rony, and Richerand, have been named to inoculate, gratuitously, with the cow-pock, the indigent at Paris, in the name of the Medical Society of Emulation.

Art. 20. *Flora of Peru and Chili.*

Don Hypolito Ruir, and Don Pavon, after having traversed *Peru* and *Chili* upwards of ten years, have returned to Madrid, where they are publishing the Flora of *Peru* and *Chili*, on large paper, with fine engravings.

Art. 21. *On the Application of sulphurated hydrogenous Vapours in mercurial Gout.*

Mr. Molvitz, of Stutgart, recommends the topical application of the vapour of water impregnated with sulphurated hydrogen gas, in arthritic pains arising from the continued use of mercury, or in what he calls the mercurial gout. The affected foot is put upon a small bench placed in a bathing-tub, into which several pints of water are poured upon one or two ounces of liver of sulphur fresh prepared with lime. The patient having brought the affected part into a convenient position, several glasses of strong vinegar are added to the mixture, after which the bathing-tub must be closely covered, that the gas, which is now disengaged, may only touch the

3 affected

affected parts. We have known the mineral waters impregnated with sulphurated hydrogen gas, such as those of Harrogate, to be very successfully used in the form of a tepid bath in similar cases. Dr. Garnett recommends a solution of kali sulphuratum to stop a salivation, (see Med. and Phys. Journ. for Jan. 1801;) and in his Treatise on the mineral Waters of Harrogate, he mentions its use in colica pictonum;—indeed, we have little doubts of its diminishing the injurious effects of mercury, lead, arsenic, and other metallic poisons.

Art. 22. *Utility of formic Acid in Stiffness of the Joints.*

Mr. Molvitz likewise praises the use of the vapours of the *formic* acid in gouty pains and stiffness; for which purpose, a quantity of the large species of ants is to be infused in hot water. Mr. Hufeland adds, that he also found in his practice, those baths of ants extremely serviceable in the gout, and particularly in the worst kinds of it, arthritic lameness and nodous gout.

Art. 23. *American Thesaurus Medicus.*

The medical professors of Philadelphia are about publishing a *Thesaurus Medicus*, or Collection of the best inaugural Dissertations, which have been written by the graduates of the university of Pennsylvania.

[*American Review and Lit. Journal.*

Art. 24. *Curious galvanic Experiment.*

An account of a curious galvanic experiment has been lately published by C. Fourcroy. Among the new facts with which the science of nature is daily enriched, none is so remarkable, or deserves more the attention of philosophers, than that relating to the inflammation of iron by galvanism. The apparatus for the experiment, made at the French National Institute, in the sitting of the first class, on the 10th of June, before the Count of Leghorn, consists of eight plates of zinc, and eight plates of copper, from 10 inches to $7\frac{1}{2}$ inches in diameter, and from a line and a half to two lines in thickness, placed upon each other, and separated two and two by pieces of cloth of the same size, well moistened with saturated solution of ammonia. Two pieces of metal at the extremities of this apparatus, the zinc and the copper, were made to communicate by means of two silver wires, at the extremity of one of which was a piece of very fine iron wire, rolled in a spiral form, the free

free point of which projected beyond the silver wire. At the moment of contact the iron wire becomes red, and emits very bright sparks. Sometimes it inflames with a real deflagration in the atmospheric air. This last effect always takes place in oxygen gas, and has a perfect resemblance to the inflammation which iron experiences when immersed in that gas, after a piece of lighted tinder has been attached to it.

In the air, the wire often becomes red, fuses into globules, is vaporized at the same time that it emits bright sparks; and the portion of the wire next to that which has been fused, becomes brittle like the oxyde of that metal. If, instead of forming the communication with wires, the branches of a pair of scissars be employed, as is frequently done in tying the piles, there is exerted in the extremity of the one which touches the zinc, a bright spark, accompanied with a decrepitation.

The communicating wire, when immersed in hydrogen gas, and in carbonic acid gas, is also luminous; but it is only redness, or incandescence, as the wire does not change colour, and still retains its ductility. This incandescence is manifested when the experiment is made under mercury, with gas, and conductors very dry; the effect therefore is not owing to the water decomposed on the conducting wires, but to two causes united.

The motion of the fluid reddens the iron; and the air, particularly the oxygen gas in which it is immersed, inflames it, and causes it to burn with a vivid deflagration.

Small parcels of zinc placed on the last plate, and touched by a brass wire communicating with the lower plate, are sometimes reduced into powder, or into smoke at the moment of contact, and a very sensible decrepitation is then produced, but without inflammation. This phenomenon is not so constant as the inflammation of the iron wire.

This inflammation does not take place, unless the plates of copper and zinc be from 10 to $7\frac{1}{2}$ inches, at the least, in diameter.

It is most remarkable, that piles composed of these large plates, give only feeble shocks, and effect the decomposition of water very slowly; while if each of the plates be divided into four, and if these small plates be placed one above the other, with pieces of cloth moistened with an ammoniacal solution interposed between each pair, they produce a commotion four times as strong, and a much speedier decomposition

of

of water, without exciting an inflammation of the wire. Thus the galvanic power which ignites metals, rises in a ratio different from that which decomposes water, and excites muscular movements.

The first of these powers appears to follow the size of the metallic plates piled on each other, and the second, the number of the plates, and their superposition: the first increases with the size of the plates, without increasing with their number; the second increases with the number, without sensibly increasing in proportion to the diameter of each of them, at least, so far as has been tried.

C. Fourcroy goes on to observe, that it is not proved that the galvanic effects are the same as those of electricity, notwithstanding the identity hitherto admitted by very eminent philosophers between these two fluids. It even appears, he says, that the more experiments and discoveries are multiplied, the more this pretended identity disappears, or is weakened. We have however no doubt in our own minds respecting this identity; we have repeatedly seen the gold leaf electrometer affected by the galvanic influence, and Dr. Wollaston has lately decomposed water by sending a stream of common electricity through two exceedingly fine wires inserted into a tube containing that fluid; indeed by this means all the chemical effects produced by galvanism may be obtained.

We have seen the experiment with the large plates, tried in London with success; and Mr. Cruickshank, with one of his troughs, which has been described in Nicholson's Journal, has been able to inflame a mixture of hydrogen and oxygen gases: when a communication is made by a platina wire from the silver end of this trough, to water connected with the zinc end, the water is exploded into vapour, with a hissing noise similar to that produced by plunging a red-hot iron in water: when the petal of a blue flower is laid on the zinc side, and touched with the wire from the silver side, it is instantly changed to a red; but when treated in the contrary way, it immediately assumes a green colour.

We ought to apologize for taking up so much of this part of our Number with an account of galvanism; but the subject is extremely curious, and not unconnected with medicine; and the prosecution of it will in all probability throw new lights on physiology.

THE

LONDON MEDICAL REVIEW.

VOL. VII. N° XXXI. SEPTEMBER MDCCCI.

ART. I. *Description and Treatment of cutaneous Diseases. Order II. Scaly Diseases of the Skin.* By ROBERT WILLAN, M.D. F.A.S. Quarto. 100 pages. 12 plates. JOHNSON, London. 1801. Price 1*l.* 4*s.*

THE knowledge of cutaneous diseases has not kept pace with the other branches of medical science. A considerable share of attention has been given by many, both of the ancient and modern writers, to the investigation of the nature and phenomena of this class of complaints; but whether it has been from the real difficulty of the subject, or from the want of that minuteness of discrimination, which is so necessary for obtaining accurate ideas of diseases characterized principally by their external appearance, our views on this subject have hitherto been very vague and imperfect.

The medical world must, therefore, have much satisfaction in knowing, that the investigation of cutaneous diseases has occupied the attention, for a considerable time, of a gentleman well qualified, from comprehensiveness of view, and accuracy and acuteness of observation, to make considerable progress in the subject. Nor will they be disappointed at the perusal of either the first part of the work, or of that of which we are now to present our readers with an analysis; both which they will find estimable, as well from their clearness and perspicuity, as from the striking beauty and execution of the plates with which they are illustrated.

A subject of this kind, which has not hitherto been treated in a systematic form, can scarcely be expected to be perfected by one man, however eminent for his talents or observation. We flatter ourselves, however, that the subject will now be followed up by men of ability; that the descriptions of the author will be compared with the appearances as they present themselves, any varieties or deviations pointed out, and thus what has been long a desideratum in medical science completely supplied.

The FIRST ORDER of this work, PAPULOUS ERUPTIONS, appeared above three years ago, and was noticed by us with approbation in a very early number of our Review. From the long period which has elapsed between the appearance of that order and the second, we lament that there is so little prospect of the work being soon completed; we admit, however, with the author, the difficulty there is in ensuring regularity where the co-operation of various artists is required; and we therefore make every allowance for the delay.

Before proceeding in our analysis, it may not be improper again to present our readers with the arrangement which the author lays down, as well as to subjoin the definition of the terms which he employs; which latter was not inserted in our account of the First Order, and is particularly necessary, as the subject is nearly new. He arranges cutaneous diseases into seven orders, which are characterized by the different appearances of, 1st, Papulæ—2nd, Scales—3rd, Rashes,—4th, Vesicles,—5th, Pustules—6th, Tubercles—7th, Maculæ; and the generic distinctions comprised under each order are as follows:

" ORDER I. Strophulus (red gum, tooth eruption, &c.)—Lichen (spring-eruption, Scorbutic pimples, &c. — Prurigo (gratelle, or universal itching of the skin.)

" ORDER II. Lepra (leprosy of the Greeks)—Psoriasis (dry or scaly tetter)—Pityriasis (dandriff)—Icthyosis (fish-skin.)

" ORDER III. Rubeola (measles)—Scarlatina (scarlet-fever — Urticaria (nettle-rash) — Roseola (summer-rash, or rose-rash) — Purpura (purple or scorbutic rash)—Erythema (red rash.)

" ORDER IV. Erysipelas (St. Anthony's fire)—Pemphigus (vesicular fever) — Pompholyx (water-blebs)—Herpes (ringworm, shingles, wildfire, &c.)—Varicella (chicken-pox)—Miliaria (miliary eruptions)—Eczema (heat-eruption)—Aphthæ (thrush.)

" ORDER V. Impetigo (running scab)—Ecthyma (ulcerated tetter)

tetter)—Variola (small-pox)—Scabies (itch)—Porrigo (scald head, &c.)

"Order VI. Phyma (boils, carbuncles, &c.)—Verruca (warts)—Acne (stone-pock; red, tuberculated face, &c.)—Lupus, or noli me tangere—Elephantiasis (Arabian leprosy)—Frambæsia (yaws.)

"Order VII. Ephelis (sun-spots)—Nævus—Spilus, moles, and other original marks."

The definitions he gives are the following:

"I. Scurf (furfura;) small exfoliations of the cuticle, which takes place after some eruptions on the skin; a new cuticle being formed underneath during the exfoliation.

"II. Scale (squama;) a lamina of morbid cuticle, hard, thickened, whitish and opaque.

"III. Scab; a hard substance covering superficial ulcerations, and formed by a concretion of the fluid discharged from them.

"IV. Stigma; a small red speck in the skin, occasioning no elevation of the cuticle. Stigmata are generally distinct or apart from each other. They sometimes assume a livid colour; and are then termed petechiæ.

"V. Papula; a very small and acuminated elevation of the cuticle, with an inflamed base, not containing a fluid, nor tending to suppuration.

"VI. Rash (exanthema;) consists of red patches on the skin, variously figured, in general confluent, and diffused irregularly over the body, leaving interstices of a natural colour.

"VII. Macula; a permanent discolouration of some portion of the skin, often with a change of its texture, but not connected with any disorder of the constitution.

"VIII. Tubercle; a hard, superficial tumour, circumscribed, and permanent; or proceeding very slowly to suppuration.

"IX. Vesicle (bulla;) an elevation of the cuticle, of a large size, irregularly circumscribed, and containing a transparent watery fluid. Vesicles with a dark-red, or livid-coloured base, are usually denominated phlyctænæ.

"X. Pustule; an elevation of the cuticle, sometimes globate, sometimes conoidal in its form, and containing pus, or a lymph which is in general discoloured."

The various kinds of pustules are:

"1. Phlyzacium; a pustule containing pus, and raised

on a hard, circular, inflamed base, of a vivid red colour. It is succeeded by a thick, hard, dark-coloured scab.

"2. PSYDRACIUM; a minute pustule, irregularly circumscribed, producing but a slight elevation of the cuticle, and terminating in a laminated scab.

"3. ACHOR; a pustule appearing most frequently about the head, which contains a straw-coloured fluid, having the appearance, and nearly the consistence, of strained honey.

"4. PHLYCTIS; a small pustule with a circular base slightly inflamed, containing a lymph, which is sometimes clear and pellucid, but more frequently whitish like whey, or pearl-coloured. The pustule terminates in a laminated scab.

"Under this head may be ranked the pustules denominated by authors hydroa, or hidroa, boa, sudamina, and miliary pustules."

"The SECOND ORDER, SCALY DISEASES OF THE SKIN, includes those affections, which are characterized by an appearance of scales arising from a morbid state of the cuticle, as specified in the second definition. The cuticle is not, however, the only seat of these complaints: their real origin seems often to be indurated papulæ, or larger elevations of the true skin, which by pressure, or distention, injure the texture of the cuticle, and produce thickened, irregular layers of it. The scales or crusts thus formed, have not always been distinguished from scabs succeeding confluent pustules, or superficial ulcerations; whence we find, in medical writers, several dissimilar diseases improperly connected together. I shall endeavour to avoid such inaccuracies, by strictly observing the second and third definitions.

"The generic diseases of the present order, are LEPRA, PSORIASIS, PITYRIASIS, and ICTHYOSIS.

"I. By the term LEPRA, I mean to express the complaint so denominated by the most accurate of the Greek physicians. It is characterized by scaly patches, of different sizes, but having always nearly a circular form. I have observed, in this country, three varieties of the disease, which may be described under the titles of *Lepra vulgaris, Lepra Alphos*, and *Lepra nigricans*.

"1. The *lepra vulgaris* exhibits first small, distinct elevations of the cuticle, which are reddish, and shining, but never contain any fluid. On their surface, when examined through a magnifier, the cuticular lines are found obliterated: and, within a few hours, a thin, white scale is formed

on

on the top of each of them. In three or four days, the small elevations appear flattened, and are at the same time dilated, by an extension of their bases, to the size of a silver penny. These patches continue to enlarge gradually, till they nearly equal the dimensions of a crown piece. They have always an orbicular, or oval form; are covered with dry scales, and surrounded by a red border. The scales accumulate on them, so as to form a thick, prominent crust, which is quickly reproduced, whether it fall off spontaneously, or may have been forcibly detached. After its removal, the surface appears, through a magnifier, to be porous, and irregular, or wrinkled, but the furrows do not coincide with the lines of the contiguous sound cuticle. No pain or uneasiness attends the above eruption, except that a slight degree of itching is felt, when the person affected with it becomes warm in bed, and that a sensation of tingling is produced by sudden changes in the temperature of the atmosphere.

"This species of lepra sometimes appears first at the elbow, or on the fore-arm; but more generally about the knee. In the latter case, the primary patch forms immediately below the patella. Within a few weeks, several other scaly circles appear along the fore part of the leg and thigh, increasing by degrees till they come nearly into contact. The disease is then often stationary for a considerable length of time. If it does advance further, the progress is towards the hip and loins; afterwards to the sides, back, and shoulders; and about the same time to the arms and hands. In the greater number of cases, the hairy scalp is the part last affected: although the circles formed on it remain for some time distinct, yet they finally unite, and cover the whole surface on which the hair grows, with a white, scaly incrustation. This appearance is attended, more especially in hot weather, with a troublesome itching; and with a watery discharge for several hours, when any portion of the crust is detached, which takes place from very slight impressions. The pubes in adults is sometimes affected in the same manner as the head: and, if the subject be a female, there is usually an internal pruritus pudendi. In some cases of the disorder, the nails, both of the fingers and toes, are thickened, and deeply indented longitudinally. Either the whole, or some part of each nail, is harder, and more prominent than usual. Under several of them also may be observed one, two, or three, round yellowish specks, which, on advancing to the end of the fingers, in consequence of the growth

growth of the nail, will be found to originate from a deposition of curdly, sebaceous matter, having an extremely fetid odour.

" When the lepra extends to all the parts above-mentioned, it becomes highly disgusting in its appearance, and inconvenient from the stiffness and torpor occasioned by it in the limbs. The disease, however, even in this advanced stage, is seldom disposed to terminate spontaneously. It continues nearly in the same state for several years, or sometimes during the whole life of the person affected, not being apparently connected with any disorder of the constitution.

" A regular mode of diet, with an appropriate medicinal course, acts very slowly on the lepra, yet will at length accomplish its cure. The steps by which it proceeds to a termination are as follows: First, the incrustation separates from about the centres of the patches, and is no longer reproduced. The scales being farther and farther removed, a circle of red, shining cuticle, deeply indented, appears within the original patch, which still retains a broad, hard, scaly ring, or border. This border continues, till the cuticle within it assume the usual colour and texture. It then gradually disappears; and the cuticular lines being extended over it, erase every vestige of the disease."

This form of lepra, the author observes, generally affects both sides, appearing at each elbow, or knee, about the same time, and extending from thence along the limbs in a similar manner; the scaly patches constituting it, are generally situated, where the bone is nearest the surface; and there is no alteration in the patches first affected till near the termination, when all of them begin to look better, nearly about the same time. The patches never appear on the cheeks, chin, nose, or near the eyebrows. No disadvantage ever arises from the obstruction of perspiration over a large surface, consequent on this disease. The author confines the term lepra to the disease so called by the best Greek writers, and the descriptions given of it in Paulus Ægineta and Actuarius nearly answer to his. The Arabian physicians constantly apply the term lepra to the elephantiasis of the Greeks; Celsus, as he does not make use of it at all, probably comprehended it under the general denomination of impetigo; and Hippocrates speaks of it as a mere superficial affection rather than a disease.

" The lepra is said by some authors to be both contagious and hereditary; experience, however, sufficiently demonstrates that the lepra vulgaris is not contagious: but that there is a

predisposition

predisposition to it communicated hereditarily, I can readily admit, having, in several instances, observed it to be thus transmitted. A slow pulse, or a languid circulation of the blood, and, what must generally be connected therewith, a harsh, dry, impermeable state of the skin and cuticle, appear to constitute a fundamental part of the predisposition. From such a state of the integuments, morbid effects arise, more especially at the decline of life: hence the disease much oftener occurs, and is more inveterate after the age of forty, than at any earlier period; an observation made long ago by Hippocrates and Galen."

Of the occasional causes, the author lays little stress upon different articles of food; the only ones which he can point out with any certainty, are exposure to cold and moisture, and the accumulation of sordes on the skin, to which those are peculiarly liable who work among dry powdery substances.

2. In the *lepra alphos* the scaly patches "are smaller than those of the lepra vulgaris; and also differ from them in having their central part depressed or indented. This disorder usually begins about the elbow, with distinct, eminent asperities, of a dull-red colour, and not much larger than papulæ. These in a short time dilate to nearly the size of a silver penny. Two or three days afterwards, the central part of them suffers a depression, within which, small, white, powdery scales may be observed. The surrounding border, however, still continues to be raised, but retains the same size, and the same red colour as at first. The whole of the fore-arm, and sometimes the back of the hand, is spotted with similar patches; they seldom become confluent excepting round the elbow, which in that case, is covered with an uniform, white crust. This affection appears in the same manner upon the joint of the knee, but without spreading far along the thigh or leg. I have seldom seen it on the trunk of the body, and never on the face. It is a disease of long duration, and not less difficult to cure than the foregoing species of lepra: even when the scaly patches have been removed by persevering in the use of suitable applications, the cuticle still remains red, tender, and brittle, very slowly recovering its usual texture. The small hairs of the skin are not destroyed, as several authors state, nor altered with respect to their colour and texture, in any form of the lepra Græcorum.

"The causes of the alphos are perhaps nearly the same as those of the lepra vulgaris. It should, however, be observed,

that the alphos is found much oftener to affect young persons, than the latter does.

"3. The *lepra nigricans* differs little from the lepra vulgaris as to its form or distribution. The most striking difference is in the colour of the patches, which are dark and livid. They appear first on the legs and fore-arms, extending afterwards to the thighs, loins, neck, and hands. Their central part is not depressed as in the alphos. They are somewhat smaller in size than the patches of the lepra vulgaris; and not only is the border livid, or purplish, but the livid colour of the base likewise appears through the scaly incrustation, which is seldom very thick. It is further to be observed, that the scales are more easily detached than in the other forms of lepra, and that the surface remains longer excoriated, discharging lymph, often with an intermixture of blood, till a new incrustation forms, which is usually hard, brittle, and irregular.

"The lepra nigricans affects persons, whose occupation is attended with much fatigue, and exposes them to cold or damp, and to a precarious or improper mode of diet, as soldiers, brewers' labourers, butchers, stage-coachmen, scullermen, &c. Some women are also liable to it, who are habituated to poor living and constant hard labour."

In the treatment of lepra, the Greek physicians always premised bleeding, and strong purgative medicines, but depended most on various external applications.

Frequent bathing or washing seems to the author the most essentially necessary for the cure of the two first species of lepra; and he thinks, that the sulphureous waters of Moffat, Harrowgate, and Croft, are of much service, whether applied externally or internally. He speaks favourably of the use of the Bath waters, from the authority of Dr. Falconer, and of sea bathing; but it seems to him proper, at first to use a bath of warm sea water till the skin be softened, and then to go into the open sea. The plan should be pursued for several successive summers. The simple warm bath may be sufficient in the slighter attacks.

The watery solution of sublimate, and the ung. hydrargyri nitrati, are very efficacious in removing the crust and softening the skin; but they are not preferable to the tar ointment, which, to those effects, joins that of allaying the troublesome itching which often attends the disease. From the experience of the author, antimonials, sulphur, and nitre, have no considerable

siderable efficacy, nor decoctions of emollient herbs, of guaiacum, sarsaparilla, mezereon, or elm-bark, nor mercury, except in the form of sublimate in small doses, nor nitrous or marine acid. He has found advantage from the aqua kali puri in the dose of thirty drops three times a day.

Black and white hellebore, the flesh of vipers, tincture of cantharides, cucumbers, and the herb called Britannica, which seems to be a species of cochlearia, have been extolled by many.

The author gives a communication from Dr. Crichton on the use of the solanum dulcamara, or bitter sweet, which we shall give in the Doctor's own words:

" 'It is now upwards of seven years since I first tried the 'dulcamara for the cure of obstinate diseases of the skin. I 'was induced to do so by the perusal of a short, but well 'written practical essay on the subject, by the learned Pro-'fessor of Botany in the university of Goettingen, Dr. Althoff. 'This gentleman relates ten cases of cutaneous eruption, which 'he describes as analogous to the itch, but not the true itch, 'all of which were cured by this remedy. He confesses, at 'the same time, that it failed in a number of others. Professor 'Althoff, and the other German physicians who employ it, 'seem to have taken their hint concerning it from the essay of 'Mons. Carrere on the Dulcamara.

" 'Out of twenty-three cases of lepra Græcorum, in 'which I have tried it, two only have resisted its action. All 'the others were completely cured. That I was not mistaken 'in the nature of the complaint you yourself can testify, as 'you have seen two or three of the cases alluded to, and in 'all the others the appearance of the disease was similar.

" 'The true lepra is the only disorder of the skin in which 'I would venture to assert the dulcamara will generally effect 'a cure. Next to lepra, it appears to me to do most good in 'psoriasis and pityriasis. As to rheumatism, for which it 'has been so highly praised by Boerhaave, Sauvage, Carrere, 'Werlhof, and others, I have not found it at all equal to the 'remedies which are generally employed in this country for the 'removal of that painful and troublesome disorder. I exhibit 'the dulcamara as follows:

" '℞. Stipitum dulcamaræ unciam j.

" 'Aquæ puræ libram jß: decoque ad libram j; et liquorem frigefactum cola.

" 'Of this decoction, I generally desire the patient to take 'two ounces, at first, every morning, noon, and evening; 'but I afterwards increase the quantity until the pint is

 'consumed

'consumed every day. At the same time I order the patient 'to wash the skin with a stronger decoction, which greatly 'accelerates the cure. The remedy seldom begins to exhibit 'any evident good effects for the first eight days.

" 'It ought to be remarked, that the dulcamara, when first 'exhibited to very delicate people, and hysterical women, often 'produces syncope and slight palpitation of the heat, now and 'then nausea and giddiness; these symptoms always shew 'that the quantity exhibited is too large. If a smaller dose be 'given, and any aromatic tincture added to it, such as the 'compound spirit of lavender, it ceases to produce such uneasy 'symptoms.'

" None of the remedies above mentioned are applicable for the cure of the lepra nigricans. This form of the disease requires, in the first place, a regular and nutritive plan of diet, with moderate exercise: it may be afterwards wholly removed by the use of bark, and the mineral acids, sea-bathing, &c."

II. Psoriasis. This disease " is characterized by a rough and scaly state of the cuticle, sometimes continuous, sometimes in separate patches of various sizes, but of an irregular figure, and for the most part accompanied with rhagades, or fissures in the skin." From the lepra it may be distinguished by being more superficial, variously figured, and throwing off bran like patches; by its cessation and recurrence at certain seasons; and by its being usually attended with a disorder of the constitution. Celsus describes psoriasis as a species of impetigo, and some medical authors give it the denomination of psora, or scabies sicca.

The author proceeds to describe the varieties of this complaint under the names of *psoriasis guttata*, *psoriasis diffusa*, *psoriasis gyrata*, *psoriasis palmaria*, *psoriasis labialis*, *psoriasis scrotalis*, *psoriasis infantilis*, *psoriasis inveterata*.

" 1. The *psoriasis guttata* appears in small, distinct, but irregular patches of laminated scales, with little or no inflammation round them. The patches very seldom extend to the size of a sixpence: they have not an elevated border, nor the oval or circular form by which all the varieties of lepra are distinguished; but their circumference is sometimes angular, and sometimes goes into small serpentine processes. The scale formed upon each of them is thin, and may be easily detached, leaving a red, shining base. The patches are often distributed over the greatest part of the body, but more particularly on the back part of the neck, the breast, arms, loins, thighs, and legs. They appear also on the face, which rarely happens in lepra;

lepra; in that situation they are red, and more rough than the adjoining cuticle, but not covered with scales.

"The psoriasis guttata often appears on children in a sudden eruption, attended with a slight disorder of the constitution, and spreads over the body within two or three days. In adults, it commences with a few scaly patches on the extremities, proceeds very gradually, and has a longer duration than in children. Its first occurrence is usually in the spring season, after violent pains in the head, stomach, and limbs: during the summer it disappears spontaneously, or may be soon removed by proper applications; but it is apt to return again early in the ensuing spring, and continues so to do for several successive years. When the scales have been removed, and the disease is about to go off, the small patches have a shining appearance: and they retain a dark red, intermixed with somewhat of a bluish colour, for many days, or even weeks, before the skin is restored to its usual state.

"In the venereal disease there is an eruption which very much resembles the psoriasis guttata, the only difference being a slighter degree of scaliness, and a different shade of colour in the patches, approaching to a livid red, or very dark rose colour.

"This eruption is usually seen upon the forehead, breast, between the shoulders, or in the inside of the fore-arms, in the groins, about the inside of the thighs, and upon the skin covering the lower part of the abdomen.

"When mercury is administered, the little scales are soon detached and fall off; but the discolouration still remains, though it becomes gradually fainter as the mercurial course proceeds; and some vestiges of the cutaneous affection usually appear for two or three weeks after all the venereal symptoms have been removed.

"The syphilitic psoriasis guttata is attended with, or soon followed by, an ulceration of the throat. It appears about six or eight weeks after a chancre has been healed by an ineffectual course of mercury: a similar appearance takes place at nearly the same period, in some cases where no local symptoms had been noticed. When a venereal sore is in a discharging state, this eruption, or other secondary symptoms, often appear much later than the period above mentioned. They may also be kept back three months, or even longer, by an inefficient application of mercury. If no medicines be employed, the syphilitic form of the psoriasis guttata will proceed during several months, the number of the spots increasing, and their bulk being somewhat enlarged, but without any other material alteration.

" 2. The *psoriasis diffusa* spreads into large patches irregularly circumscribed, reddish, rough, and chappy, with scales interspersed. It commences, in general, with numerous minute asperities, or elevations of the cuticle more perceptible by the touch, than by sight. Upon these, small, distinct scales are soon after formed, adhering by a dark central point, while their edges may be seen white and detached. In the course of two or three weeks all the intervening cuticle becomes rough and chappy, appears red, and raised, and wrinkled, the lines of the skin sinking into deep furrows. The scales which form among them are often slight, and repeatedly exfoliate. Sometimes without any previous eruption of papulæ, a large portion of the skin becomes dry, harsh, cracked, reddish, and scaly, as above described. In other cases the disorder commences with separate patches of an uncertain form and size, some of them being small, like those in the psoriasis guttata, some much larger. The patches gradually expand till they become confluent, and nearly cover the part or limb affected. Both the psoriasis guttata and diffusa likewise occur as a sequel of the lichen simplex. This transition takes place more certainly after frequent returns of the lichen.

" The parts most affected by the psoriasis diffusa are the cheeks, chin, upper eyelids, and corners of the eyes, the temples, the external ear, the neck, the fleshy parts of the lower extremities, and the fore-arm from the elbow to the back of the hand along the supinator muscle of the radius: the fingers are sometimes nearly surrounded with a loose, scaly incrustation; the nails crack and exfoliate superficially. The scaly patches likewise appear, though less frequently, on the forehead and scalp, on the shoulders, back, and loins, on the abdomen, and instep. This disease occasionally extends to all the parts above mentioned, at the same time: but in general it affects them successively, leaving one place free, and appearing in others, sometimes again returning to its first situation.

" The psoriasis diffusa is attended with a sensation of heat, and with a very troublesome itching, especially at night: it exhibits small, slight, distinct scales, having less disposition than the lepra to form thick crusts. The chaps or fissures in the skin, which usually make a part of this complaint, are very sore and painful, but seldom discharge any fluid. When the scales are removed by frequent washing, or by the application of unguents, the surface, though raised and uneven, appears smooth and shining: and the deep furrows of the cuticle are lined by a slight scaliness. Should any portion of the

the diseased surface be forcibly excoriated, there issues out a thin lymph mixed with some drops of blood, which slightly stains and stiffens the linen, but soon concretes into a thin dry scab: this is again succeeded by a white scaliness, gradually increasing, and spreading in various directions. As the complaint declines, the roughness, chaps, scales, &c. disappear: and a new cuticle is formed, at first red, dry, and shrivelled, but which, in two or three weeks, acquires the proper texture.

"Symptoms of general disorder attend the first appearance of the psoriasis diffusa, as headach, inappetence, pain or sickness at stomach; pains, cramps and coldness of the extremities, with a sense of universal languor and debility. During the progress of the eruption, these symptoms abate, or wholly disappear; but they, for the most part, precede any returns of the complaint, which usually take place in winter, or early in the spring. The duration of the psoriasis diffusa is from one to four months.

"The complaint denominated with us the *baker's itch* is an appearance of the psoriasis diffusa on the back of the hand, commencing with one or two small, rough, scaly patches, and finally extending from the knuckles to the wrist. The rhagades, or chaps and fissures of the skin, are numerous about the knuckles, and ball of the thumb, and where the back of the hand joins the wrist. They are often highly inflamed and painful, but have no discharge of fluid from them. The back of the hand is a little raised or tumefied, and, at an advanced period of the disorder, exhibits a reddish, glossy surface, without crusts, or numerous scales. This complaint is not general among bakers; it is only aggravated by their business, and affects those who are otherwise disposed to it.

"The *grocer's itch* has some affinity with the baker's itch or tetter; but, being usually a pustular disease at its commencement, it probably belongs to another genus.

"*Washerwomen*, probably from the irritation of soap, are liable to be affected with a similar scaly disease on the hands and arms, sometimes on the face and neck, which, in particular constitutions, proves very troublesome, and of long duration.

"The venereal disease rarely assumes the form of psoriasis diffusa.

"3. The *psoriasis gyrata* is distributed in narrow patches or stripes, variously figured; some of them are nearly longitudinal; some circular, or semicircular, with vermiform appendages; some are tortuous, or serpentine; others like earth-

worms

worms or leeches: the furrows of the cuticle being deeper than usual, make the resemblance more striking, by giving to them an annulated appearance. There is a separation of slight scales from the diseased surface, but no thick incrustations are formed. The uniform disposition of these patches is singular: I have seen a large circular one situated on each breast above the papilla; and two or three others of a serpentine form, in analogous situations along the sides of the chest. The back is often variegated in like manner, with convoluted tetters similarly arranged on each side of the spine. They likewise appear in some cases on the arms and thighs, intersecting each other in various directions. A slighter kind of this complaint affects delicate young women and children in small scaly circles or rings, little discoloured: they appear on the cheeks, neck, or upper part of the breast, and are mostly confounded with the herpetic or pustular ring-worm.

"The psoriasis gyrata has its remissions and returns, like the psoriasis diffusa; it also exhibits, in some cases, patches of the latter disorder on the face, scalp, or extremities, while the trunk of the body is chequered with the singular figures above described."

There is occasionally an appearance in the venereal disease "somewhat analogous to the psoriasis gyrata, in which the tetters assume the form of a crescent or horseshoe; or appear as rings, either oval or circular, the central part being neither scaly nor discoloured. If the progress is not stopped by medicines, these become at last superficial ulcerations.

"4. The *psoriasis palmaria* is an obstinate species of tetter nearly confined to the palm of the hand. It commences with a small, harsh, or scaly patch, which gradually spreads over the whole palm, and sometimes appears in a slighter degree on the inside of the fingers, and wrist. The surface feels rough, from the detached and raised edges of the scaly laminæ: its colour often changes to brown, or black, as if dirty; yet the most diligent washing produces no favourable effect. The cuticular furrows are deep, and cleft at the bottom longitudinally in various places, so as to bleed on stretching the fingers. A sensation of heat, pain, and stiffness in the motions of the hand attends this complaint: it is worst in winter or spring, and occasionally disappears in autumn or summer, leaving a soft, dark red cuticle: but many persons are troubled with it for a series of years, experiencing only very slight remissions. Every return or aggravation of it is preceded

preceded by an increase of heat, and dryness, with intolerable itching.

"*Shoemakers* have the psoriasis palmaria locally, from the irritation of the wax they so constantly employ. In *braziers, tinmen, silversmiths,* &c. the complaint seems to be produced by handling cold metals. A long predisposition to it from a weak, languid, hectical state of the constitution may give effect to different occasional causes. I have observed it in women after lying in: in some persons it is connected or alternates with arthritic complaints."

Sometimes, the author observes, a similar appearance takes place on the soles of the feet; and sometimes, in this disease, there is a thickening of the preputium, attended with painful cracks, and producing, at length, phymosis.

"5. *Psoriasis labialis.* The psoriasis sometimes affects the prolabium without appearing on any other part of the body. Its characteristics are, as usual, scaliness intermixed with chaps, and fissures of the skin. The scales are of a considerable magnitude, so that their edges are often loose while the central points are attached. A new cuticle gradually forms beneath the scales, but is not durable: in the course of a few hours it becomes dry, shrivelled, and broken; and, while it exfoliates, gives way to another layer of tender cuticle, which soon in like manner perishes. These appearances should be distinguished from the slight chaps and roughness of the lips produced by very cold or frosty weather, but easily removed. The psoriasis labialis may be a little aggravated by frost, or sharp winds, yet it receives no material alleviation from an opposite temperature: it is not indeed confined within any certain limit, or period of duration, having in several instances been protracted through all the seasons. The under lip is always more affected than the upper: and the disease takes place more especially in those persons whose lips are full and prominent.

"6. *Psoriasis scrotalis.* The skin of the scrotum may be affected, in the psoriasis diffusa, like other parts of the surface of the body: but sometimes a roughness and scaliness of the scrotum appears as an independent complaint, attended with much heat, itching, tension, and redness. The above symptoms are succeeded by a hard, thickened, brittle texture of the skin, and by painful chaps, or excoriations, which are not easy to be healed. This complaint is sometimes produced under the same circumstances as the prurigo scroti, and appears to be in some cases a sequel of it. A species of the psoriasis scrotalis

scrotalis likewise occurs in the lues venerea, but merits no particular attention, being always combined with other secondary symptoms of the disease.

" 7. *Psoriasis infantilis.* Infants between the ages of two months and two years are occasionally subject to the dry tetter. Irregular, scaly patches, of various sizes, appear on the cheeks, chin, breast, back, nates, and thighs: they are sometimes red, and a little rough, or elevated, sometimes excoriated, then again covered with a thin incrustation, and lastly intersected by chaps or fissures. The general appearances nearly coincide with those of the psoriasis diffusa."

It is extremely difficult " to distinguish the general appearance of the psoriasis infantilis, from the scaly patches which occur in infants, as secondary symptoms of the lues venerea. The latter are generally accompanied with a sore throat, and a peculiar hoarse sound in the child's crying, which assists those who are attentive, and experienced in forming a diagnosis.

" 8. The *psoriasis inveterata* is characterized by an almost universal scaliness, with a harsh, dry, and thickened state of the skin. It commences from a few irregular, though distinct patches on the extremities. Others appear afterwards on different parts, and, becoming confluent, spread at length over all the surface of the body, except a part of the face, or sometimes the palms of the hands, and soles of the feet. The skin is red, deeply furrowed, or wrinkled, stiff and rigid, so as somewhat to impede the motion of the muscles, and of the joints. So quick likewise is the production and separation of scales, that large quantities of them are found in the bed on which a person affected with this disease has slept. They fall off in the same proportion by day, and, being confined within the linen, excite a troublesome and perpetual itching. An incrustation of the scalp forms in the manner stated under the article lepra vulgaris. The nails of the fingers and toes become convex, and are thickened at their extremities. A frequent renewal of them takes place, the new nails soon assuming the morbid form. At their articulations, the thumb and fingers are enlarged, and contracted, or in some cases retorted. On the abdomen the skin is very red, deeply indented, and brittle: no thick incrustation forms, but the scales appear thin, and semitransparent, peeling off from time to time in large flakes. Painful excoriations are occasioned by the pressure of some parts of the clothing, or by the attrition of contiguous surfaces, as of the nates, groin, thighs, scrotum, &c. At an advanced period of the disease, the cuticle is often more

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extensively destroyed: I have indeed seen all the extremities, the back, and nates, excoriated at the same time, with a very profuse discharge of thin lymph from the surface. In the course of a few weeks, however, that discharge usually abates, when a new cuticle is formed, of a dry, harsh, or almost horny texture, and which from time to time separates in large pieces. The same circumstances are frequently repeated; and the disease proceeds on without any considerable remission for an indeterminate length of time, especially in old people. Young persons are not so liable to it: nevertheless I have seen it in some under thirty years of age, and in others before the time of puberty, arising perhaps from a strong hereditary disposition."

The psoriasis diffusa occasionally becomes permanent and inveterate, like the last-mentioned complaint.

Psoriasis, when of considerable extent, seems to the author to be always connected with some disease of the constitution; it is not contagious; it most frequently occurs in those who have the sanguineous, combined with the melancholic temperament. Women are more liable to it than men, and they more particularly after lying-in. It frequently also occurs in young women labouring under chlorosis, and proves, in that case, very obstinate.

Of the exciting causes, the author observes, that "food difficult of digestion, eating too great a quantity of acid fruits, the unseasonable use of the cold bath, large draughts of cold water, taken when the body has been heated by exercise, and some improper mixtures of food, as of milk and fish, are the circumstances to which patients refer the complaint when it appears in a sudden eruption on the skin: and such causes will," he apprehends, "be deemed sufficient to excite the disease in those who are predisposed to it constitutionally.

"This disease generally occurs," according to the author's observations, "in the spring season, when the changes of the state of the atmosphere are most frequent and severe."

The sudden application of cold will sometimes produce a retrocession of psoriasis; and whenever this occurs, there is vomiting and great disturbance in the system, which are best removed by the reappearance of the eruption. On this subject, as on several others treated in this work, the author's observations and those of Dr. Falconer, of Bath, nearly coincide.

"The three first species of psoriasis, when they appear in a sudden eruption attended with febrile symptoms, may be advantageously treated by administering in the evening an emetic dose of

of ipecacuanha, and the following day two or three grains of calomel, or some other gentle purgative: afterwards, by the use of fixed alkali, either in its concrete or liquid form, by a light moderate diet, by frequently washing with tepid water, and by abstinence from fruits, acids, and fermented liquors, the above disorders may be brought to a conclusion within two or three weeks. But should the scaly patches, through neglect at their first appearance, or from an unhealthy state of the constitution, have enlarged considerably, and spread over the greater part of the body, a more elaborate plan will be necessary." This consists of the free use of antimonials, of the warm bath, with repeated friction, and of the chalybeate, or sulphureous waters of different parts of the island. The decoctions of elm bark, sarsaparilla, dulcamara, &c. have also their share of utility.

The *psoriasis inveterata* requires the same plan of treatment as the lepra vulgaris and alphos.

For the *psoriasis palmaria* the same internal remedies are proper as for the other forms of the disease; vapour of hot water, oiled silk gloves, and diluted ung. nitratum, will occasionally be useful.

In the *psoriasis labialis* it is necessary to have the lips almost constantly covered with some mild unguent or plaster; to avoid cold; to be temperate; and to take suitable stomachic medicines for the flatulence, &c.

"In the *psorialis scrotalis*, besides the use of general remedies, care should be taken to keep the parts clean by washing them with warm water, water-gruel, &c. and to prevent the effects of attrition by an unguent composed of three parts of unguentum ceræ, and one part of the unguentum hydrargyri nitrati.

"The scaly tetter of infants may be relieved by the use of antimonials, and by warm bathing, or washing with water-gruel. When considerable excoriations take place, it is proper to use mild applications, as the ceratum lapidis calaminaris, and unguentum cerussæ acetatæ, mixed in equal proportions. Calomel is occasionally necessary, when there are inflamed pustules, or tubercles."

"III. Pityriasis. This consists of irregular patches of small, thin scales, which repeatedly form, and separate; but never collect into crusts, nor are attended with redness, or inflammation, as in the lepra, and scaly tetter." There are two varieties of it, the pityriasis capitis, and pityriasis versicolor.

"1. *Pityriasis capitis*, when it affects very young infants, is termed by nurses the *dandriff*. It appears, at the upper edge

edge of the forehead and temples, as a slight whitish scurf set in the form of a horse-shoe: on other parts of the head there are large scales, at a distance from each other, flat, and semi-pellucid. Sometimes, however, they nearly cover the whole of the hairy scalp, being close together, and imbricated. A similar appearance may take place in adults, but it is usually the effect of lepra, scaly tetter, or some general disease of the skin. Elderly persons have the pityriasis capitis in nearly the same form as infants: the only difference is, that this complaint in old people occasions larger exfoliations of the cuticle.

"When the hair is thin, or the head shaven, the scales may, with a little attention, be removed by the use of soap and warm water, or by a slight alkaline lotion. To enforce this practice is particularly necessary: for if scales intermixed with sordes be permitted to cover the scalp for a length of time, pustules, containing an acrimonious lymph, are formed under the incrustation, and the true porrigo often supervenes, which is a disease of the scalp terminating in suppuration.

"2. The *pityriasis versicolor* chiefly affects the arms, breast, and abdomen. It is diffused very irregularly, and being of a different colour from the usual skin-colour, it exhibits a singular, chequered appearance. The irregular patches, which are at first small and of a brown or yellow hue, appear at the scrobiculus cordis, about the mammæ, clavicles, &c. Enlarging gradually, they assume a tesselated form; in other cases they are branched, so as to resemble the foliaceous lichens growing on the bark of trees; and, sometimes, when the discolouration is not continuous, they suggest the idea of a map, being distributed on the skin, like islands, continents, peninsulas, &c. All the discoloured parts are slightly rough with minute scales, which soon fall off, but are constantly replaced by others. This scurf or scaliness is most conspicuous on the sides, and epigastric region. The cuticular lines are somewhat deeper in the patches than on the contiguous parts: but there is no elevated border, or distinguishing boundary between the discoloured part of the skin, and that which retains its natural colour. The discolouration rarely extends over the whole body. It is strongest and fullest round the umbilicus, on the breasts, and sides: it seldom appears in the skin over the sternum, or along the spine of the back. Interstices of proper skin colour are most numerous and largest at the lower part of the abdomen and back, where the scales are often small, distinct, and a little depressed. The face, nates, and lower extremities are least affected: the patches are

 found

found upon the arms, but mostly on the inside, where they are distinct, and of different sizes."

It is not a cuticular disease, for on removing the cuticle the sallow colour remains as before. It is not attended with any internal disorder, is not limited to any age or sex, and is always of considerable duration. Its causes, the author has not been able to point out with certainty. Though it is not a disorder of any serious consequence, yet the author thinks it proper that it should be well understood, in order that it may not be mistaken for a syphilitic symptom. "I cannot," says he, "speak favourably of my success in the medicinal treatment of this species of pityriasis. Acids, alkalis, mercurials, and antimonials, under whatever form, seemed to produce no beneficial effect. Some advantage was however derived from using first a warm bath of sea-water, and afterwards bathing in the open sea: and in one instance the complaint was by this means wholly removed.

"IV. Icthyosis. The characteristic of icthyosis is a permanently harsh, dry, scaly, and, in some cases, almost horny texture of the integuments of the body, unconnected with internal disorder. Psoriasis and lepra differ from this affection in being but partially diffused, and in having deciduous scales.

"The arrangement and distribution of the scales in icthyosis are peculiar. Above and below the olecranon on the arm, and in a similar situation with respect to the patella on the thigh and leg, they are small, rounded, prominent or papillary, and of a black colour. Some of the scaly papillæ have a short, narrow neck, and broad, irregular tops. On some parts of the extremities, and on the trunk of the body, the scales are flat and large, often placed like tiling, or in the same order as scales on the back of a fish; but in a few cases they have appeared separate, being intersected by whitish furrows. There is usually, in this complaint, a dryness and roughness of the soles of the feet; sometimes a thickened and brittle state of the skin in the palms of the hands, with large painful fissures, and, on the face, an appearance of scurf rather than of scales. The inner part of the wrists, the hams, the inside of the elbow, the furrow along the spine, the inner and upper part of the thighs, are perhaps the only portions of the skin always exempt from the scaliness. Patients affected with icthyosis are occasionally much harassed with inflamed pustules, or with large, painful boils on different parts of the body:

body: it is also remarkable that they never seem to have the least perspiration or moisture of the skin.

"This disease did not, in any case presented to me, appear to have been transmitted hereditarily; nor was more than one child from the same parents affected with it. In several instances the disease was said to have been connate, and in others to have occurred two or three months after birth; in one case it appeared soon after the small-pox, at the age of two years, and had continued six or seven years without alteration.

"When a portion of the hard, scaly coating is removed, it is not soon produced again. The easiest mode of removing the scales is to pick them off carefully, with the nails, from any part of the body, while it is immersed in hot water. The layer of cuticle which remains after this operation is harsh and dry; and the skin did not, in the cases I have seen, recover its usual texture and softness; but the scales were prevented from forming afterwards, by the repeated use of the warm bath, along with moderate friction."

The author informs us from Buffon, that the inhabitants of Paraguay are very subject to this complaint; and he also quotes a case from the Philosophical Transactions, vol. xiv. similar to what he describes. It is of a man of 40 years of age, who was affected, a few weeks after his birth, with a thickening of the skin, and the gradual formation of thick rustling scales of a dark colour, covering every part of his body, except his face, the palms of his hands, and the soles of his feet. This covering was without pain or uneasiness, and he shed it every year. He had six children, all of whom had the same covering, and, as well as himself, were free from it during the time of their having the small-pox. Only one of them was living in the year 1754, whom the writer of this account saw with the father.

A similar state of the skin to that in icthyosis, but in a much slighter degree, occurs sometimes in the extremities of a person after long ill health; on the healing of inveterate ulcers of the legs; and in some cases of anasarca.

The author has never seen a case of *icthyosis cornea*; but concludes with mentioning two; one from the Philosophical Transactions, vol. xlviii. part ii. the other from the Philosophical Transactions, No. 176. In the former, the skin over the whole body (that of a young woman of 17 years of age) was hard to the touch, like wood or a dry hide; it prevented the free motion of any of the muscles, gave her a sense of tightness after eating, had lost its natural warmth, and was insensible,

insensible, except to pressure by the nails or a pin. She never sweated, and the urine was in considerable quantity and loaded with salt.

The latter case is of a girl of 13 or 14 years of age, who was affected from her third year with horny excrescences from various parts of the body, particularly the joints, both large and small, which were fastened to the skin like warts, and sometimes fell off, and were renewed.

We cannot take leave of the author without expressing our hopes that he may soon be able to give us an opportunity of presenting our readers with a continuation of his work.

Art. II. Klaproth's *Analytical Essays on mineral Substances.*

(Continued from page 30.)

THE nineteenth Essay of this very interesting and valuable work contains the analysis of *lepidolite,* which our industrious author found to consist of 54.50 parts of silex, 28.25 of alumine, 0.75 of manganese and oxyd of iron, and 6.50 of water.

This fossil was first taken for a species of gypsum, and then for a species of zeolite. The first account published of it is that of Born, in the Chemische Annales, 1791. That it has no pretensions to the gypseous genus, appears from this analysis; neither does our author think that it can be ranked, as Born has done it, among the zeolites. "When we attempt," he observes, "in the mineralogical system, to separate and to determine the various species of fossils, not in a vague manner, but according to fixed characters; the question is, then, in which of its properties does the specifical character of zeolite consist? I think, in the following; that it is moderately hard, and gives no sparks with steel; that, urged by the flame upon charcoal, it is rendered milk-white and opake, swelling much at the same time, and forming ramose excrescences, yet without actually fusing into a globule; and that, besides the siliceous and aluminous earths, the calcareous, likewise, is an essential constituent part of it. The mother-of-pearl-like lustre, the gelatinous coagulum, which it forms with acids, and its phosphorescent nature on ignition, cannot be considered as any of its essential properties.

"Since, therefore, the present fossil does not shew the same appearances upon charcoal as the zeolite, but as it intumesces but moderately, while at the same time it fuses into a

 perfect,

perfect, and, in part, translucid, round globule; and, moreover, as it is absolutely destitute of lime for one of its constituent parts, these facts afford sufficient ground to distinguish it from zeolite, in the systematical arrangement of fossils, and to rank it as a distinct species."

The total absence of calcareous earth in this fossil, is highly worth remarking; " for silex and argil, when in their purest state, are absolutely infusible in any proportion of the mixture; but become fusible, when lime in a proportionate quantity enters into the combination. On the contrary, the lepidolite, consisting merely of silex and argil, and without any portion of lime, is of so easy fusion, that it properly may be reckoned among the most fusible stones.

" In many cases, the metallic oxyds, indeed, likewise act as powerful fluxing media; yet, in the present instance, the metallic portion is too small to be capable of being considered, with any degree of probability, as the cause of the fusibility of this fossil.

" Is there not, perhaps, in those argillaceous stones that fuse in the fire, without any admixture either of absorbent earths or of metallic calces being found in them, some hidden principle, promoting their fusion, which is hitherto unknown, and is of a volatile nature? Fel-spar affords an instance of them. This stone, while continuing in its natural unaltered state, runs into a glass; whereas porcelain-clay, which results from its decay, is infusible in the highest degree. Therefore, it might not seem unreasonable to suppose, that during this transition of vitrifiable fel-spar into infusible clay, some volatile substance, as yet unknown, and capable of promoting fusion, might escape; did we not, on the contrary, find, by experience, that vitrified fel-spar, if again exposed to fire, enters again into fusion, in the same manner as it did the first time."

Our author calls this fossil *lepidolite*, (scale-stone,) because it shines on its fracture like an aggregate of minute fish scales. This, he observes, is a more appropriate name than *lilalite*, which was given to it at its first introduction to public notice, that name being derived from its colour, which is very variable.

In the twentieth Essay we have the results of our author's chemical examination, as well as an accurate description, of *cimolite*, a fossil " of which an historical knowledge has, indeed, reached our age, from the writings of ancient classics, such as Theophrastus especially, Dioscorides and Pliny; but a familiar acquaintance with them has gradually been lost since the time

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of those authors. We learn from the works of those old naturalists, that the Greeks, as well as the Romans, besides its medical use, employed the cimolic earth for technical purposes, in the preparation and cleaning of their stuffs and wearing apparel."

Mr. Klaproth observes, that "it is by the kind communication of John Hawkins, Esq. who, in his voyage to the Grecian islands, made for the advancement of natural history, has collected the genuine cimolic earth on the island Cimolo itself, or Argentiera, as it is called at present, that he has been enabled to revive the knowledge of this fossil, hitherto lost both to natural history and technology, and, at the same time, to undertake its chemical analysis."

One hundred parts of cimolite were found to contain 63 of silex, 23 of alumine, 1.25 of oxyd of iron, and 12 of water.

With respect to these constituent parts, and their proportions to each other, our author observes, "that the cimolite might properly be placed in the mineralogical system along with the common species of clay: but its distinguishing character, on which, also, its other physical properties depend, undoubtedly consists in the minutely divided state of the siliceous ingredient, as well as the most intimate mixture of this last with the argillaceous part."

In order to obtain some knowledge of the efficacy and utility of cimolite, in a technical view, Professor Klaproth "partially greased small pieces of silk and woollen cloth with oil of almonds, and covered those oily spots, on both sides, with cimolite, worked by grinding with water to the thickness of a liniment. They were then exposed to dry in the air. The next day he dipped those stuffs in water, and saw, with surprise, that, by a slight washing, the cimolite, together with all the greasy spots to which it had been applied, were removed, without leaving the slightest trace. After drying, the stuffs were again found possessed of their former cleanliness, and the original beauty of their colours completely restored."

This experiment appears fully to confirm the use of this fossil, which has been so much extolled by the ancient writers; and it seems much to surpass our best fuller's earth. "To revive the importation of cimolite, as an article of merchandise, would therefore be very desirable for the manufactures subservient to our clothing, as well as for common use; especially for precious stuffs of delicate colours, that will not well bear the agency of acids and alkaline soaps. Whence, also, the inhabitants of Argentiera make as much use of it, in the

washing

washing and bleaching of their stuffs, at this very day, as in remote ages."

"Among the Tyrolese fossils, and those of Salsburg, so remarkable by their variety, there occur certain rhombic crystals, which are most frequently found singly interspersed in a slaty chlorite *(schneidstein,)* mixed with silver-gray magnesian lamellas. Those crystals have been called rhomboidal spar on account of their figure, or magnesian spar *(bitter-spath,)* on account of this supposed constituent part."

An analysis of this mineral is given us in the twenty-first Essay, from which it appears that one hundred parts contain 52 of silex, 45 of magnesia and 3 of oxyd of iron impregnated with manganese.

"Although it is only a few years since this fossil was brought to Vienna, by some Tyrolese dealers in minerals of their country, and from thence brought into farther notice; yet it seems that Woulfe has already been acquainted with it at an earlier period. For the fossil, which he examined, and described in the Philosophical Transactions for 1799, by the name of *compound spar*, agrees with the Tyrolese."

In the twenty-second Essay we are presented with an account of Professor K.'s experiments on the supposed *muriacite*, which was first described by the Abbé Poda, who gave it this name, on account of its component parts, which, he says, are calcareous earth, muriatic acid, and water.

This fossil appeared to our author, the more to deserve a chemical examination, as it would enable us to understand, "by what means Nature could produce a combination of the earthy saline kind, which in the dry, as well as in the crystallized state, is so much disposed to deliquescence; but which, as here is supposed, exists in a dry and compact state, and at the same time requires such an excessive quantity of water to be dissolved." He therefore analyzed it, and found that its component parts were 74 of muriat of soda, 137 of gypsum, *(sulphat of lime,)* 26 of carbonat of lime, and 265 of sandy residue. Hence, he observes, the existence of a native muriat of lime in the concrete state, and also the name muriacite, which has been given to it, are incompatible with this result.

The twenty-third Essay contains an account of native alum from the alum cavern at the cape Misero near Naples, which, as it were, serves as a laboratory, where nature alone, unassisted by art, is constantly producing perfect alum. This aluminous earth is mixed with a sufficient quantity of sulphat

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of potash to assume the form of crystals instead of an efflorescence.

In the twenty-fourth Essay our author gives an account of a native saltpetre, *(nitrat of potash.)* This nitre mine was discovered by the Abbé Fortis in the year 1783, at Molfetta, in Apulia; and has since that attracted the attention of naturalists in a considerable degree. According to Mr. K.'s analysis, 1000 grains of nitre from Miseno, consist of 425½ grains of pure prismatic nitre, 2 grains of muriated neutral salt, 254½ of selenite, and 304 of limestone, 14 grains having been lost in the analysis.

From the quantity of potash contained in this mineral, as well as the native alum described in the twenty-third Essay, it would appear, that nature possesses means of producing this alkali beyond the limits of the vegetable kingdom, nay, even without any immediate influence of vegetation; at which we shall not be surprised, should the composition of this alkali, as supposed by Guyton, be proved.

In the twenty-fourth Essay we have an analysis of the mineral waters at Carlsbad, which principally contain carbonat of soda, sulphat of soda, and muriat of soda, with a small quantity of silex and oxyd of iron, and a considerable portion of carbonic acid gas. The heat of the main spring is 165° of Fahrenheit's scale.

After giving the analysis, the author makes the following curious observations on the quantities of the constituent parts of the water of Carlsbad, taken by its visitors:

"The mean number of cups which are drank is fourteen in the day, as the daily allowance is from ten to eighteen; the immoderate quantity of thirty or forty cups, and upwards, which were formerly taken, being now laid aside: one of these cups, upon an average, holds nearly ten cubic inches of water; and, therefore, will hold one hundred and forty cubic inches, which contain:

"Crystallized carbonated soda . .	150½ grains.
——— sulphat of soda . .	228
Muriat of soda	48
Calcareous earth	17⅓
Siliceous earth	3½
Oxyd of iron	¼

"Carbonic acid gas, 45 cubic inches.

"The time usually spent in the medicinal use of this spring is from three to five weeks. If, therefore, we assume, at a mean

mean rate, twenty-six days for the whole of that time, and calculate by it the quantity of water drank by each patient, it will be found to amount to three hundred and sixty-four cups, holding three thousand six hundred and forty cubic inches of the mineral water, which contain,

" Crystallized corbonat of soda . .	3913 grains.
———— sulphat of soda . .	5928
Muriated soda	1248
Calcareous earth	450
Siliceous earth	91
Oxyd of iron	$6\frac{1}{2}$

" Carbonic acid gas, 1170 cubic inches."

In speaking of the manner in which nature is supposed to impregnate the Carlsbad mineral spring, our author offers some very plausible conjectures; but we cannot agree with him, that the heat proceeds from the decomposition of pyrites, because, in that case, it ought to vary as that decomposition is effected more slowly or quickly; but the heat, like that of most of the hot springs, continues always the same, while we can by no means imagine, that the decomposition of pyrites goes on always exactly with the same celerity; but on the supposition, that a quantity of water is kept in a state of ebullition in the interior parts of the earth by an adjacent subterraneous fire, and that the vapour rising from it, condensed in some cold cavity, finds its way out at the spring, we can easily account for the uniformity of the heat.

In the twenty-sixth Essay our author gives the result of his examination of the salt springs at Konigsborn; and likewise of the incrustation deposited on the boiler; which last he finds to be a mixed mass of sulphat of lime, carbonat of lime containing a little iron, and a sandy siliceous earth.

It is a curious circumstance, that those salt springs, which contain a large portion of muriat of soda, should contain sulphat of lime, but no sulphat of soda; for we should, at the first view, expect, that the sulphat of lime would be decomposed according to the known laws of affinities; the sulphuric acid combining with the soda of the common salt, and forming sulphat of soda. " But it must be here considered," says our author, " that the agency of the attractive forces in bodies likewise depends on the various degrees of temperature: and this is really the case in this instance: for it is shewn, by experience, that the generation of sulphat of soda from the muriats of lime and soda, or, in other words, the generation of

of glauber-salt from selenite and common salt, can take place only at a cold, much below the point of freezing; but to such a low temperature the salt-springs are not exposed in their subterraneous reservoirs and canals. Whence it also happened, that when, with this view, I repeated the experiment with sixteen ounces of the mass which incrusted the boiler *(pfanenstein,)* and which, during the winter, had been exposed to the cold, and had, in part, fallen to pieces, the newly-generated glauber-salt immediately appeared. Its quantity, ascertained by means of muriated barytes, and calculated for the crystalline state, did however, in general, amount to no more than thirty-six grains."

The twenty-seventh Essay contains any analysis of *spinell*, a gem resembling the ruby, which was found to consist of 74.50 parts of alumine, 15.50 of silex, 8.25 of magnesia, 1.50 of oxyd of iron, 0.75 of lime.

In the twenty-eighth Essay we have the analysis of the *emerald*, one of the best known of the gems, and which has been reckoned, even in remote antiquity, among the most esteemed precious stones, on account of its rich green colour. The emerald from Peru, according to our author's analysis, consists of 66.25 parts of silex, 31.25 of alumine, and 0.50 of oxyd of iron.

"The denomination *garnet*, served to the elder mineralogists as a generic, or collective name, in which they included almost all roundish crystalline forms, encompassed by defined lateral facets, or all the species of stones, of, as they were called, polyhedral crystallization. At present, however, the generic name, garnet, had been confined within narrower limits; for the white garnet, as well as the black, have been justly removed from it, and arranged as distinct genera; the first under the name leucite; the second under that of melanite.

"It may also be foreseen, that several other fossils now classed as species, or as varieties of the garnet, besides those last mentioned, will in time receive another place in the systematic arrangement of minerals: in consequence of more accurate observations concerning the deviation, not only with regard to their external appearance, but likewise with regard to their chemical constituent parts, by which they are distinguished from the true and strictly determined principal genera, to which last the Bohemian garnet principally belongs."

The *Bohemian garnet* is examined in the twenty-ninth Essay, and found to consist of 40 parts of silex, 28.50 of alumine,

16.50 of oxyd of iron, 10 of magnesia, 3.50 of lime, and 0.25 of oxyd of manganese.

The *Oriental*, or *Sirianic garnet*, is distinguished from the *Bohemian*, both by its colour and specific gravity. The former contains a much greater proportion of iron; indeed the quantity of this metal is so considerable, that by mere fusion in a charcoal crucible, our author obtained from one hundred grains of the oriental garnet, a fine button of iron of twenty-three grains; this occasions its greater specific gravity. It likewise, when fused alone in a clay crucible, runs into an enamel glass of a blacker colour than that of the Bohemian garnet.

The thirtieth Essay is taken up with the analysis of this gem, one hundred parts of which afforded the author 36 of oxyd of iron, 35.75 of silex, 27.25 of alumine, and 0.25 of oxyd of manganese.

Among the different stones, "which the mountain Vesuvius brings up from the bowels of the earth, in the native unaltered state, that crystalline fossil may be reckoned, which the inhabitants of Naples call the Vesuvian gem.—Mineralogists had variously classed it with shörl, chrysolite, hyacinth, topaz, &c. and by the adjective, Vesuvian, or volcanic, distinguished it as a variety of the above-mentioned gems; till Werner established it as a distinct genus of stone, and gave it the name, Vesuvian; as, till then, it was found on Mount Vesuvius only."

In the thirty-first Essay we are presented with the analysis of Vesuvian. The Essay is divided into two sections; the first contains the Vesuvian, from Mount Vesuvius, which was found to consist of 35.50 grains of silex, 33 of lime, 22.25 of alumine, 7.50 of the oxyd of iron, 0.25 of the oxyd of manganese. The second section contains the analysis of the Vesuvian from Siberia. This mineral was discovered in the year 1790, by Laxmann, at the mouth of the river Achtaragda, where it falls into the Wilui. The first notice of it was given by Pallas, under the name of crystals of hyacinth. This naturalist observed, that this fossil strongly resembles the Vesuvian of Italy; this agreement has been determined by Estner, from the external characters of both; and this oryctognostic conjecture has been confirmed by our author's analysis, who found the Siberian Vesuvian to consist of 42 parts of silex, 34 of lime, 26.25 of alumine, 5.50 of oxyd of iron, with a slight trace of oxyd of manganese.

In the thirty-second Essay we have an examination of leucite.

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Though the fossil at present known by this name often occurs in Italy, (where it constitutes one of the ingredients, not only in the lavas, the crude, as well as those that have been converted by volcanic fires into tufas, and slag sand, or volcanic ashes, but also of other mingled masses of rocks,) yet the indications of its existence in other parts of the world are very scarce and uncertain.

For the purpose of analysis, our author tells us, that he "selected only such crystals of leucite ejected by Vesuvius, as by their external appearance and internal lustre, together with the yet unchanged state of their stony matrix, (which is a black-gray corneous mass of basalt,) have convinced him, that they had suffered no alteration either by volcanic fire, or by any subsequent decay. Most of them were of the size of a nutmeg and upwards. Before they were employed, they were freed as much as possible from the stony matrix adhering to their outside, and likewise from the particles of hornblende usually contained in their middle. In this purified state their specific gravity was 2.455."

His analysis afforded him silex, alumine, and potash, in different proportions from different specimens. As an instance we shall just mention the analysis of the leucite from Albano, which contained 54 parts of silex, 23 of alumine, and 22 of potash.

In speaking of potash, our author says, "I now flatter myself with the hope, that, by the experiments here communicated, and several times repeated, I have fully demonstrated the existence of potash in the leucite, as one of its chemical constituent parts. Nevertheless, I am contented to defer the general reception of this new discovery till several other chemical naturalists have re-examined and confirmed it. This trial may be the sooner expected, since my method of proceeding in the main object of this investigation is attended neither with laborious operations, nor with much loss of time.

" But if that alkali, as soon as it can no longer be considered as a substance, produced only in the juices of plants during their vegetation, be required to occupy a more suitable place among the original, simple mineral substances, it will then likewise be necessary to give it a more appropriate name.

" The term potash, which in the new chemical nomenclature is raised to a generic name, cannot among us Germans claim a general acceptation; as its origin depends on a trivial etymological ground, and has been introduced into use merely from this circumstance, that formerly, instead of calcining

furnaces,

furnaces, iron pots were employed to ignite the inspissated lyes procured from wood-ashes.

"I should wish to recommend, that the denominations hitherto used, of vegetable alkali, lixiviated vegetable salt, potash, &c. be discarded, and the name *kali* be employed in their stead. In like manner should the appellations, mineral alkali, soda, &c. denoting the alkaline basis of common salt, give place to its ancient name,—*natron.*"

(To be concluded next month.)

Art. III. *Medical Researches and Observations; being a Series of Essays on the Practice of Physic. Essay I. On the Nature, Cause, and Cure of Fever; with Forms for extemporaneous Prescription.* By Dr. Andrew Ferguson. Octavo. 375 pages. Phillips, London. 1801. Price 6*s*.

FEVER has ever been the favourite subject of hypothesis; from the earliest periods to which our knowledge of the history of medicine extends, we find it to have engaged a very considerable share of attention, and even to have given rise to many of the theories which present themselves to our notice. But though much labour and genius have continually been employed in investigating the causes of the phenomena which constitute this disease, we may still consider ourselves as possessing but little knowledge on the subject. System has given place to system, and hypothesis to hypothesis, without doing more than convince us of the fascinating power of theorizing, and the difficulties with which it is attended. We are well acquainted with the symptoms which constitute fever, the circumstances which favour its approach, or denote its violence or leniency, while experience informs us of the plan of cure which is most likely to be successful in removing it: we even know that it frequently arises from the operation of a substance known only by its effects, to which we give the name of contagion; but what the peculiar nature of this substance is, and what is the proximate cause of the symptoms which it occasions, we are as yet completely ignorant.

The Essay on Fever, which we now lay before our readers, is, we are informed, the first of a series of essays on the nature, causes, and cure of the various diseases to which the human body is subject. It is published, the author tells us, "from motives of philanthropy, and a desire for the improvement

ment of science;" and he "craves indulgence on the ground of good intention."

"Among the moderns, Doctors Cullen and Brown have most attracted his observation: the last of whom, he has principally followed in his theory,—viewing it as coming nearest to that simplicity, uniformity, and method, which can render medicine truly estimable. He does not, however, entirely subscribe to Dr. Brown's system, but has added considerably to the diagnostic part of the science; and has also, in several other respects, materially differed from him."

"Fever, strictly so called," says the author, "is a disease free from essential or primary topical affection. In all fevers, there are symptoms which clearly prove them to be fevers, although they are combined with different local affections, and a great assemblage of symptoms." We are inclined to think, however, that he carries the idea of its mortality considerably too far, when he says, that "in the common continued fever of this country, there is, on an average, not less than one dies out of every seven or eight who are affected with it."

The form of fevers is "very liable to be changed; an alteration in the state of the natural and vital powers, has often the effect of changing the appearance and type of fevers, especially climate, method of treatment, and state of the cause. This has made many doubt whether fevers are essentially the same; and it has occasioned a difference in opinion about their division. Some have gone so far as to affirm, that synocha and typhus are the same affection, and proceed from the same cause. Dr. Clark asserts, that there is no inflammatory fever without local affection: we allow that this is often the case; but as far as my observation goes, it is seldom that local affection will produce inflammatory fever. The fever of the distinct small-pox is allowed to be synocha; the fever exists previous to the eruption, and after the eruption generally ceases. The fever is not the effect of the eruption, the eruption is the effect of the fever. This is the case with all inflammatory fevers; the inflammation, or local affection, is merely the effect of the fever, not the cause."

The phenomena of common continued fever, and of the form of typhus, as it usually attacks the inhabitants of Aberdeen, the author gives us at some length. Those of the former will, "in general, apply to all fevers, whether continued or intermittent," and are very similar to the series of symptoms which Dr. Cullen mentions in his First Lines, as an example, both of continued and intermittent fever.

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The *proximate cause* of fever is a favourite subject of the author, and is the basis upon which his practice is formed. The proximate cause he considers as "founded upon a knowledge of the remote. The latter, when known, and its effects upon the system properly understood, at once directs us to the former."

His reasoning upon it is almost entirely that of Brown: "every animate being in nature," says he, "as soon as it can be called animate, requires the due action of certain powers to preserve it in the state of animation; if these are withheld, it becomes dead matter. The semen, which contains the principle of animal, or vegetable life, can never produce action of itself, unless certain powers be applied; these powers are heat and moisture: animal and vegetable nature require this. An egg, although it contains all the parts necessary for the formation of an animal, will never produce a chicken, without a proper degree of heat, regularly conducted, for a certain time. This is all that is necessary for producing the animal. In Egypt, it has long been a custom, to produce the chicken from the egg by means of common fire; and it has been demonstrated by Reaumur, that there is no living principle transfused from the hen to the embryo, more than what depends upon the effect of common fire.

"It is plainly proved, that fire is the first mover in the animal machine; and I believe it will be found the only active principle during its existence: a certain degree of which is absolutely necessary for the preservation of health, and the generating of wholesome fluids."

Oxygen, however, is another power which he regards as essentially necessary to our existence; and the colour of the blood, he is of opinion, clearly shews that it contains it. "When there is a proper oxydation of the system, there is strength; when it is deficient, or in excess, a morbid state ensues. It is always deficient in fevers, when debility is the cause. A certain degree of heat is the proper stimulus for acting upon the elementary fibres, and allowing the necessary oxydation of the system.

"In all animate beings," continues he, "the phenomena of life depend upon a certain property, inherent in 'medullary 'nervous matter,' and muscular fibres. Various authors have had notions of this, under the names of irritability, vis insita, sensorial power, and excitability. This property seems to be the chief principle of life; it requires to be acted upon by a set of powers, which may be distinguished by the name of

vital powers; the operation of which must necessarily be stimulant; so called from their effects of producing increase of action, in the functions to which they are applied. The state of life produced by the operation of the vital powers, is distinguished by the name of vitalment. The vitalment of the system is affected, as the vitality is either increased, diminished, or in just proportion; or, as the vital powers have been applied in excess, deficience, or in just proportion."

When the vital powers have been applied in too great a quantity, "the muscular fibres lose that intimate attraction between their parts which is necessary to give vigour, and debility from the exhaustion of vitalment is produced, which is called indirect." When, on the other hand, there is a want of the necessary application of the vital powers, the vitalment is accumulated, and direct debility the consequence. "The vitalment is the index, to guide our judgment and practice, in restoring the vitality to its vigorous state. As it has been found so much connected with the state of the medullary, nervous, and muscular fibres, we may look upon the state and condition of them, during its accumulation and waste, as affording us the means of coming to a proper knowledge of its effects upon the system, and functions at large.

"We are, of consequence, only to look for the proximate cause of diseases in medullary, nervous, and muscular fibres, or what may be called the nervous system. It is chiefly on these that the vital, or hurtful powers operate, either in producing health or a morbid state, weakness or vigour. We are indebted to modern discovery, for the true knowledge of the operation of the hurtful powers, as well as their action upon the principle of life: by this knowledge, our plans of cure are more simplified, and the numerous classifications of the materia medica superseded.

"All the symptoms of fever arise from, and depend upon, debility; this therefore is what we consider as forming the proximate cause. The great debility in the nervous and muscular system, indicates that there is something wanting, which is the cause of all the phenomena of fevers. From the want of this principle proceeds, the diminished energy of the brain, and collapsed state of the surface, the frequent contraction of the heart, and all the other phenomena of fever. This shews, that the affinity between the elementary particles, which compose the nervous and muscular substance, must be altered; the appearance, which of consequence takes place, has been called atony."

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The deficiency of oxygen in the system, (which is always the case in fevers where debility is the cause,) and of the natural heat of the body, and the incapacity of the body for attracting and retaining the proper quantity of oxygen, are, he thinks, owing to debility. In delirium from fever "we may consider the elementary particles, which compose the fabric of the intellectual organ, in such a state of derangement and deoxygenation, as occasioned by the deficience of free communication between the different functions; that the proper degree of stimulus can neither be sufficiently applied or retained; and that this is the source of derangement of the mental functions in fever, we observe by daily experience; for nothing restores the sensibility and energy of the brain, but stimulating and invigorating powers.

"Delirium never occurs but where there is extreme debility, except in phrenitis, and in this latter it depends upon increased vitalment.

"During the first stage of fever, debility, and deficience of the vital powers, are apparent; the weakness of the pulse, coldness, imperfect sensation, and muscular debility, directly prove it. In the second, or hot stage, debility, and deficience of the vital powers, are not so apparent; which has been the cause of great error, both in theory and practice. It is difficult to account for this change of the system; we are however certain, that the body cannot change from a state of weakness, to a state of strength, so suddenly. If the first stage be the effect of debility, the second must also be owing to the same cause."

In the hot stage, "the blood returns to the surface, and along with it a heat much greater than what is natural. The collapsed state, and atony of the surface, do not suddenly yield, either to the stimulus of the blood, or the heat. The affinity between the elementary particles of our system being separated, and a laxity taking place, the heat, that is propelled with the blood, becomes accumulated; it acts as a stimulus, and produces a very disagreeable and uneasy burning sensation upon the surface. When it accumulates to a certain degree, it is extricated from the system in the form of sweat, which is the last stage of fever."

The author adverts to the different opinions which have been held upon the subject of fever, particularly those of Boerhaave and Cullen, both which he considers as ill-founded. The power which is known by pathologists by the name of vis medicatrix naturæ, he regards as having no existence; and

where certain phenomena, as the hot and sweating fit of fevers, present themselves, they are not to be considered as efforts of nature to remove the morbid state, but as symptoms of debility and the effects of the proximate cause. The advocates for the doctrine of a vis medicatrix, he thinks, are inconsistent with their own ideas, when they attempt to moderate reaction, the effort of Nature, by the antiphlogistic regimen : "for why," he exclaims, "would you diminish the efforts Nature makes to remove spasm or concoct the morbific matter? Does not this destroy your arguments and hypothesis?" Whether the "reaction proceeds from debility, or an effort of nature, it is agreeable to reason, to support this reaction of the system; and we find, that the means employed for supporting the vigour of the system, are the only powers that tend to diminish this reaction, and remove the morbid state : while the supporters and admirers of the practice of employing the antiphlogistic regimen in fevers, have never furnished us with any cases where it has been of service, or removed any of the urgent symptoms, except in pure inflammatory fever; and as this proceeds from a different cause, here it is of essential service."

The author now goes on to the remote causes of fever. Predisposition he considers, with Dr. Brown, as a middle state between health and disease, and as being produced by the same remote causes, which only require extension in order to produce disease. The two species of debility, either of which is the cause of fever, are produced by various means; direct debility by "contagion, deficience of oxygen, miasmata, cold, the depressing passions, unwholesome food, and hæmorrhages from various parts of the body;" indirect debility, by such as weaken indirectly; for example, excess of heat, venery, oxygen, food, blood, drink, frequent intoxication, &c.

"Contagion is a matter generated in the body, while labouring under certain diseases, and has been supposed also to arise from putrid animal substances in a dead state. If long retained, or pent up without being exposed to the atmospheric air, their virulence and activity are much increased. Putrefaction has been considered as the very cause of contagion; but how far they are connected, at present we cannot tell, as contagion acts upon our bodies in an immaterial manner."

He attempts to refute Dr. Mitchill's idea on this subject, and says, that "it is more natural to suppose the contagious principle to be a ternary, or quaternary combination of hydrogen, azot, and some of the other elements of the putrefying body; and in this case, we conclude, that contagion is neither

neither acid nor alkaline; but from every appearance it inclines more to the latter."

The most dangerous way of applying contagion is by the immaterial effluvia of fomites.

Of miasmata as little is known as of contagion; but the author thinks they act in the same way.

"Direct stimulants seldom produce fever as arising from debility, but more frequently prove the cause of synocha. The remote causes of fever," (we presume the author means typhus or intermittent fever,) "are negative causes; it is deficience of their action which produces fever, by not affording the proper vitalment of the system, and thereby allowing the vitality to accumulate."

Cold, as a cause of fever, he supposes to produce an accumulation of the vitalment by obstruction of the stimulus of heat; all its other effects, whether tonic, astringent, or stimulant, he imagines ill-founded. "Cold is a negative power, it only diminishes the immoderate heat, and by reducing it to the stimulant degree of operation favours the oxydation of the system.

"The phenomena which have given occasion to suppose it possessed of a stimulant or tonic power, are a redness of the face under exercise in cold weather, and a sensation of heat being sometimes felt, after an exposure to cold; and from its bracing parts relaxed by heat, as the scrotum, recti muscles, calves of the legs, &c. These effects do not arise from the stimulus of cold, but either from the stimulus of exercise, or the reduction of too much heat. When men are oppressed with cold, their desire is for heat; they endeavour by exercise to counteract its effects: this acts as a stimulus, and produces a florid colour, from the blood being forced to the surface. When too hot, the desire is for cold; when cold temperature is applied in this state, the heat is reduced according to the degree of cold applied; if it is therefore applied to parts relaxed by too much heat, its tendency is to diminish the heat, and reduce it to the stimulant degree. This is the cause of the vigour which ensues after the application of cold.

"Cold acts upon the body, and produces an inflammatory disposition, after sudden or violent vitalment; and when strong stimulants have been applied, they generally produce heat, determination to the skin, and perspiration; when cold is therefore applied, or a lower degree of temperature than that of the body, the perspiration and fluids are determined inwardly. When the body is warm, from the action of stimulants,

lants, the effects of cold are not perceived at the time, and therefore overlooked; consequently, when the action of stimulants is considerable, and the body exposed to a cold temperature, it never fails to produce either partial inflammation, or universal inflammatory diathesis."

Having given our readers a pretty full account of the author's ideas on the operation of contagion and cold, we think it unnecessary to say any thing further on the other causes of fever, as their mode of acting will be readily collected from what we have given of the author's doctrine. The diversity of fevers, he thinks, is owing to "the degree of strength and power of the remote causes acting upon a strong or weak vitality; a combination of causes acting together; and a particular kind of remote cause." He is of opinion, that there is no ground for Dr. Cullen's idea of there being a diurnal revolution of the habit, and could never discover any evening exacerbation.

The prognosis in fevers must "depend upon our knowledge of the causes inducing them, and their operation upon the system, causing either a mild or malignant disease. The chief danger is, when the violence of the symptoms is confined to any of the organs necessary to life; or when the vitality is affected in such a manner, that the organization of the parts under its influence, affords a proof of its inactivity or diminution, by the morbid vitalment.

"The accumulation of vitality, or what was formerly understood as reaction, and thought to be a salutary phenomenon, is the appearance indicating the degree of danger and debility of the nervous system in fevers."

On the doctrine of critical days he lays little stress.

The cure of fever is conducted by our author in conformity to his idea of its cause. "As its principal cause," says he, "is debility, and as the debility is induced by powers producing a deoxygenation and laxity of the solids, in which is inherent the vitality; the principal indication, therefore, is, to induce an opposite state of the system, to give the proper tone and strength to the muscular and nervous system; which is to be done by two principal agents, properly regulated, the external and internal powers; or by food and medicine, of such kinds, quality, and quantity, as are suited to the state of the functions, and degree of debility arising from the languor and inactivity of the vitality.

"We are not to found any indication upon, or employ those means, which are commonly considered as tending to moderate the violence of reaction; because, in general, they increase the

the cause, or debility. When we found our indication upon obviating the cause and effects of debility, it includes under it those symptoms, improperly called reaction, — and every other symptom proceeding from the cause. The same means which remove debility, remove all the symptoms of fever. Neither are we to found any indication upon the putrescency of the fluids. The appearance of putrescency indicates a great diminution of strength, and happens only in malignant species of fevers, or towards the latter end of typhus. We do not consider putrescency to reside in the fluids; it is more reasonable to conclude, that its principal seat is in the solids; because the powers inducing this state, have the same operation as the other remote causes,—only inducing a greater degree of deoxygenation of the system; and the remedies which are employed for debility, are those most effectual in removing putrescency."

As the debility of fever is not always of one kind, we are to consider which species of debility is present, and act accordingly. "In the indirect kind, the vitality is exhausted, and becomes so insensible, that it cannot be affected by the powers which are natural to life, unless they be increased to a degree equal to the cause. In this case, we must give food and medicines of such strength and quality, as are equal to the cause which produced the debility,—and by diminishing it gradually, restore the body to its natural state.

"In direct debility, the dose must be at first weak, and afterwards increased to one much stronger."

As the abstraction of the vital powers produces debility, it is to be avoided in the cure of fever: we are to encourage rather than dissuade from the accustomed impressions of heat, light, and noise: patients should be rather incited to walk about the room, and join in conversation, than advised to complete quiet.

Food and drink are "the principal stimulants in use," and the most adapted for supporting the strength. "The frequent giving of food, supports the system, prevents the languor, produces a determination to the skin, and removes the cause of debility by its stimulus. Animal food is best suited for this purpose."

It may be given in the form of broths. The other substances proper for food are strong decoctions of wheat, barley, oats, rice, &c.; and, in general, that is best in fever, "which is of a fluid form and light, and easy of digestion."

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The weakness and irritability of the stomach in fever, he thinks, is generally the cause of the sickness and vomiting which frequently occur; and these, he is of opinion, are best relieved "by supplying the patient plentifully with food, whereby his strength may be supported, and the tone of the stomach restored."

Drink should, in general, be given rather warm, and the best adapted for "fevers is wine, added in proper proportion to infusions or decoctions of hartshorn, wheat, barley, lint-seed, or oats. It will be very useful and pleasant to the patient, to vary the drink, as he will soon tire upon one kind. We must not, however, forget good brisk beer, which almost all patients in fevers earnestly desire. If this be fully saturated with fixed air, the patients may be allowed to drink freely of it, in all fevers, when debility is the cause."

On the effects of medicines in fevers, he is of opinion, that all the articles of the materia medica act in the same way; and that physicians erred much, when they imagined that each individual article had a local influence, as upon the kidneys, stomach, skin, &c. "A medicine may act in several ways, by increasing or lessening the dose; but the effects resulting from its action, proceed from its strengthening or weakening power. A small dose of a powerful stimulant, may act as a corroborant; when a double, or a triple dose of the same medicine, may act as an evacuant. It is in this way that we account for the difference in the effect of the same medicine."

The articles of medicine which the author is likely to employ upon the principles he lays down, the reader will readily anticipate. He dissuades from every thing of an antiphlogistic nature; and when evacuants even do service, he thinks it must necessarily be by their stimulant effect. Emetics, at the beginning; bark, ("as being of most service when a violent stimulus is wanted,") opium, and wine, are the principal remedies he employs in common continued fever and typhus, with occasionally blisters and stimulants of other kinds. He deprecates Sydenham's idea, that it is the principal duty of a physician to regulate the salutary motions in fever, depress them when too violent, and raise them when too languid; and thinks, that following this plan has been attended with the worst consequences.

He concludes his work with a view of the different varieties of fever from Sauvages and M'Bride, with three cases to illustrate his practice, and with two hundred and ninety-two

forms

forms for prescribing, extemporaneously, the drink, diet, and medicines, recommended in his Essay.

Having completed, as far as we conceive necessary, the analysis of this work, it remains for us to make a few observations on its principles and practice.

As the author has followed so closely the opinions of Brown, we conceive it to have been perfectly unnecessary in him to have made any alteration in the terms of the Brunonian system. A change of language is only justified by a want of precision in that formerly used, and ought not to be done but with great caution and judgment. If the vitality and vitalment of the author correspond (as we believe they do) with the excitability and excitement of Dr. Brown, we see no kind of reason why, in adopting his principles, the author should change his language; neither can we approve of the use of such terms as alphoric and contagic, which (as far as we know) are sanctioned by no other authority but that of the author.

The system of Brown, and that which the author adopts, is founded upon the idea, that there is one, and one only, unvaried action of bodies throughout nature, the degrees and modifications of which depend upon the strength of the agent, and the quantity of the excitability or vitality present. But this foundation appears to us to be somewhat defective; for though we grant that a stimulating effect is part of what may at one time or other be produced by any particular body, yet are there not peculiarities of action with which we are completely unacquainted, and concerning which we can only reason as to the fact? If we admit that all medicines agree in a common stimulant property, we are not informed on what their peculiarities depend; and those peculiarities concerning which we are ignorant, may be as much a part of their nature, and the knowledge of their peculiar action may be as necessary to acquaint us with their properties, as that which they are supposed to possess in common.

If there be one general power resident in bodies which differs only in degree of action, we might soon learn by the difference of quantity only, to produce a variety of different effects from the same individual substance, and thus to banish a vast variety of articles which are at present in use. It ought not, it would seem to us, to be necessary to employ different medicines, but only different quantities of the same medicine, to produce different effects. Vomiting and purging might, with as much propriety, be expected from different proportions of opium, as the alleviation of pain, or the production of sleep;

since

since opium, ipecacuanha, and jalap, according to the author, differ only in the degree of stimulus to which each article is capable of giving rise: if it is admitted that they differ in any thing else, it is then resorting, as we observed above, to a property which is unknown, and which may, for any thing that we know, be independent of, or, at least, superadded to the mere power of exciting action. When we view the immense catalogue of articles of food and medicine which the author gives at the close of his work, he does not appear to us in complete consistence with his own doctrine. If he be in the habit of using all those articles at different times, from observing a difference of effects, he must certainly admit, that there is something more in the action of medicines, and other bodies, than what arises from quantity alone.

If we do not consider the principles upon which the author founds his doctrine of fever as completely established, we can scarcely be supposed to assent to the doctrine itself. When he states debility to be the cause of fever, he seems to us to bring forward only a symptom common to many complaints; debility of the corporal powers, and of many of the functions, is equally observed in what are termed diseases of strength, as in those of weakness. The degree of exertion which a person can make who is affected with pneumonia, and requires bleeding, is often as small as that of one who is affected with fever, and to whom stimulants are indicated; nor is the frequency of the pulse always a necessary attendant, and an infallible mark of diseases of debility.

The author's ideas of contagion seem to be peculiar to himself; but it is, we must confess, difficult to conceive, that "a *matter* generated in the body" can act in an "immaterial way;" or that the effluvia arising from fomites, on which the matter of contagion has been deposited, can be "immaterial:" nor have we any reason to suppose, that contagion will not always, and not "most commonly" only, produce the same complaint. Contagion, he observes, is a direct stimulus, and operates by accumulating the vitalment. Its action, however, is less strong when the vitalment is vigorous than when it is depressed; but, "as the contagious principle weakens the vital power, and diminishes the violent vitalment," he thinks, (but we are persuaded that few of our readers will agree with him,) that it "may sometimes act as a means of reducing the morbid vitalment to the healthy equilibrium, which is the reason that the same cause that will produce disease at one time,

time, will not do it at another." From this observation we might expect to remove most effectually acute rheumatism and pneumonia, by exposing the patient to the contagion of typhus.

Much of the author's reasoning proceeds upon the supposition that oxygen is the principle of irritability; an idea by no means supported by the degree of evidence necessary to make it the foundation of any doctrines. We may remark here, that the author, in enumerating the combinations of oxygen with azote, has omitted a very important one, *nitrous gas;* and that he has mistaken Priestley's ideas on the subject of respiration, when he says, that "he first discovered that air, which was respired, became unfit for animal life, and was azotic gas." Azotic gas is certainly a part of the air which remains after respiration in close vessels, but not the only part; for besides that the whole of the oxygen can scarcely be abstracted, there is a considerable production of carbonic acid gas.

The author, in his method of treating fever, considers it as fully established, that no advantage was ever obtained from antiphlogistics, even in the early periods of synochus, or the common continued fever of this country, and that the hot fit itself is best treated by stimulants; but it appears to us, that he might with much propriety have allowed a small degree of credit to the numerous observations of many of our best practical writers, which are certainly not perfectly congenial with this opinion.

We cannot agree with the author in dissuading from the removal of the stimuli of light, noise, exercise, and conversation; and we believe that most of practitioners will agree with us upon this subject.

The author very properly sets aside the idea of the vis medicatrix naturæ, as supported by Stahl and Cullen; a doctrine which is now nearly exploded; but does he not favour the opinion on this subject which many of the moderns entertain, when he says, that "if the patients are left to nature altogether, the vital powers might bring about a crisis upon a certain day, provided the vitality was not greatly debilitated by excess or deficience of the remote causes?" The action of the vital powers in removing the sources of disease, by whatever laws they are regulated, is all that is meant by the operation of the vis medicatrix naturæ at present among the greater number of medical men.

Art. IV. Priestley *on the Doctrine of Phlogiston, &c.*

(Concluded from page 14.)

We now resume our analysis of Dr. Priestley's book. In the fourth section this ingenious philosopher considers the *calces of zinc*, and relates an experiment which, he thinks, proves, that when inflammable air is procured by means of zinc, it must come from the metal, and not from any water.

"On throwing," says he, "the focus of a burning lens on a quantity of zinc in common air, confined by water, in a glass vessel, the first effect is the production of flowers of zinc, which make a beautiful appearance, by their dispersion within the vessel; and during this part of the process the air is diminished, the pure part of it, no doubt, entering the calx, while the phlogisticated part remains unaffected. After this, the application of the heat being continued, there is an increase of the quantity of air, by the production of inflammable air; and instead of flowers of zinc, a black powder arises, and adheres to the inside of the vessel, and with care may be collected.

"Now, since inflammable air is produced, the antiphlogistians must say, that part of the water over which the experiment was made, was decomposed. But then I ask, where is the oxygen which, according to them, constitutes the far greater part of the water? I cannot find it any where. The water is entirely free from acidity, and the air expelled from it afterwards is even less pure than that which it yields before the process. And if I examine the black powder, (which must be the metal sublimed,) by heating it in confined common air, it becomes a whitish substance, the air is diminished, and rendered in a considerable degree impure; whereas, if it had contained any oxygen, the quantity would have been increased, and it would have been purer than common air; as when red precipitate, or minium, is treated in the same manner. It is evident, therefore, that it contained no oxygen, but a quantity of phlogiston, on the expulsion of which, and the imbibing of pure air, it became flowers of zinc."

We have no doubt that the inflammable air produced in this experiment came from the water, which begins to be decomposed when the oxygen is taken away from the common air; the black powder is the metal in its first degree of oxydation, as is evident from its being converted into flowers of zinc by an increase of heat in common air, while the bulk of the

the common air "is diminished, and rendered in a considerable degree impure," by the loss of its oxygen.

"Though the flowers of zinc," our author observes, "may contain some oxygen, I have not been able to discover any in them by any process that I have made use of for the purpose. As this substance is formed in a considerable degree of heat, I was not surprised to find that heat would not expel any thing from it; but I thought that when it was mixed with iron filings, it might, with them, yield some fixed air, as red precipitate does. But I did not find this to be the case. I got nothing in this process besides inflammable air. Also, when mixed with perfect charcoal, such as gives no air with heat, a great quantity of both fixed and inflammable air is produced; which shews that, like this substance, flowers of zinc contain little or nothing besides water, which will have just the same effect."

It is most probable, that the inflammable air procured in this experiment by means of charcoal was the gaseous oxyd of carbon: fixed air (carbonic acid) would at first come over, while the zinc parted with oxygen to the charcoal in abundance; but when that principle became diminished, the product would be the gaseous oxyd of carbon, which is inflammable.

In the fifth section, our author brings forward arguments in favour of the doctrine of phlogiston, from some circumstances in which sulphur is formed, and nitrous acid phlogisticated. The most important of them we shall examine.

"Sulphur, the antiphlogistians say, is a simple substance, and that the vitriolic acid is that substance with the addition of oxygen, or dephlogisticated air. Why, then, I ask, is not sulphur produced when dephlogisticated air is expelled from it by heat, rather than in the process with water impregnated with vitriolic acid air? For when this air is procured by making the acid pass through a red hot earthen tube, no sulphur is found. But when it is heated to dryness in inflammable air, which can supply it with phlogiston, sulphur is formed."

In answer to this, we say, that only part of the oxygen can be expelled from the sulphuric acid by heat, what remains forming volatile sulphurous acid; but when hydrogen is present, it combines with the oxygen, and forms water, while the sulphur is deposited in its proper form.

"The production of phosphorus," from the phosphoric acid heated in inflammable air, furnishes," our author thinks, "the same proof of this substance also being a compound, and that

that phlogiston enters into the composition of it, as well as into sulphur."

The result of this experiment may be explained in the same way; the hydrogen unites with the oxygen of the phosphoric acid, and forms water.

"The formation of sulphur and phosphorus, by heating the vitriolic and phosphoric acids, so as to evaporate them to dryness, in inflammable air, which then disappears, and this effect not being produced without it, or some other substance containing phlogiston, is, I think, decisive in favour of their receiving an addition of something from the inflammable air, or phlogiston, when they are converted into sulphur and phosphorus; and therefore that these substances are the compounds, and the acids the more simple substances of the two."

However decisive this circumstance may be thought by the author in favour of the phlogistic theory, the antiphlogistians will think that it may be very easily explained on their principles: when these substances are heated to dryness, the water which is formed by the combination of the hydrogen and oxygen, will be converted into steam, and consequently be invisible.

"It is said by the antiphlogistians," continues Dr. P. "that the nitrous acid never becomes coloured by imbibing any thing, but always in consequence of giving out oxygen. I think, however, that the contrary is proved by its absorbing nitrous air, which it does with great rapidity. But the same effect is produced, though not in so remarkable a manner, by means of inflammable air."

The antiphlogistians say no such thing; on the contrary, they affirm that the nitric acid becomes coloured either by losing part of its oxygen, or imbibing more azote. That the same effect should be produced by hydrogen gas, might be expected; for the hydrogen uniting with part of the oxygen of the nitric acid, and forming water, the nitric acid would become coloured, and approach to the nitrous, or even become nitrous gas. The same explanation may be given of the following experiment:

"I put," says he, "a quantity of dephlogisticated nitrous acid into a phial with a ground glass stopper, with inflammable air on its surface; and in another similar phial atmospherical air was confined with it. Both these phials I covered with water in inverted glass jars, to prevent their having any communication with the atmosphere. After long exposure in these circumstances,

circumstances, that which had the common air on its surface never acquired any colour, or only a very little, from the effect of light transmitted through two glasses with water between them; but that on the surface of which inflammable air was incumbent acquired colour very soon. I also found, on repeating the experiment, that a part of the inflammable air had been imbibed by the acid."

In the sixth section the calces of mercury are examined; and our author readily acknowledges, that the phlogistic theory is most pressed by the phenomena of these calces. "But in forming any general theory," he observes, "we must content ourselves with the fewest difficulties. It will hardly be pretended by the greatest admirers of the antiphlogistic theory, that it is attended with none. Those which attend the phlogistic with respect to these calces, I do not think to be insuperable, and farther experiments may throw more light upon them.

"As there are calces of mercury which certainly imbibe inflammable air, this substance, or the base of it, phlogiston, must be concluded to exist in that metal as an element. This is true both with respect to red precipitate, and turbith mineral.

"As to the calx of mercury from the acid of vitriol, M. Beaumé, I find, agrees with me in the observation, though I did not know it at the time, that it is not completely reducible by mere heat. But 'later observations,' Dr. Maclean says, p. 11, 'shew that the turbith mineral, or any other substance 'into which it may be converted by a red heat, does not re-'quire any addition to constitute it a metal.' And M. Adet says, p. 33, 'that the yellow oxyd of mercury has been re-'vived without addition by Messrs. Monnet, Bouquet, La-'voisier, and Fourcroy.'

"To this I can only say, that I have never been able to reduce the whole of this calx by any heat that I could apply, not even that of a burning lens of sixteen inches diameter: and this, I am confident, is a greater heat that can be raised by any furnace whatever. From being a red friable substance, this heat converts it into a yellowish glass, with the loss of about three tenths of its weight; but after this, no continuance of the same heat makes any farther change in it. Yet after this, when it is heated in inflammable air, the air is imbibed, and it is covered with a black powder, evidently ethiops mineral, into which mercury, with all its component parts, whatever they be, is known to enter. This substance also, and not directly

directly running mercury, was frequently the result of my experiments on this precipitate before I left England. This is certainly an experiment of considerable consequence. For if it be true that inflammable air be really imbibed by any calx of mercury, that it is revived by it, and cannot be revived without it, we are authorized to say universally, that some element of which it consists, and no doubt phlogiston, is a necessary component part of that metal, and therefore of all the other metals also."

We may here observe, that the superabundant oxygen is easily expelled by heat, but the last particles adhere so strongly to the metal, that they cannot be disunited, except by hydrogen, carbon, or some substance for which the oxygen has a stronger affinity that it has for the metal. This is agreeable to the laws of chemical combination, which is exerted more powerfully the more distant the substances are from saturation, and the contrary.

In page 33d our author says, "by means of a burning lens I heated a quantity of red precipitate in inflammable air, in a glass vessel confined by water, till 121 ounce measures of the air were reduced to 95. Then, examining the residuum, I found that one measure of it mixed with an equal quantity of nitrous air occupied the space of 1.77 measures. Computing from this result, it will be found that it contained 7.22 ounce measures of pure air, which added to the 26 which had disappeared, make 33.22 ounce measures of inflammable air, which had been absorbed by the calx in its revival. For that the air expelled from the calx had not contributed to the formation of water, was evident from its being found mixed with the remainder of the inflammable air. Neither had it, in this case, contributed to the formation of fixed air. For there was no sensible quantity of this air found in it, though I have sometimes found a little of it in this process. Nor can this difference in the result be thought extraordinary, when it is considered that fixed air certainly consists of pure air and inflammable air, and that it is found in other processes similar to this.

"In another experiment of this kind, I revived a quantity of the precipitate in 30 ounce measures of inflammable air, till 12 ounce measures disappeared, and the standard of the remainder, examined as in the preceding case, was 1.75. From this it appeared, that 1.495 ounce measures of air had been expelled from the calx, and that 13.495 ounce measures of inflammable air had been imbibed by it."

There can be no doubt that oxygen would be expelled in the form of gas, before the oxyd was heated to the degree necessary for the absorption of the hydrogen, or its combination with oxygen; and though the oxygen gas thus evolved, would not combine with the hydrogen and form water, without the application of a red heat, yet when the heat was increased, the hydrogen would readily unite with the solid oxygen, or nascent oxygen gas, and form water. When the heat however was farther increased, a combination accompanied by an explosion would take place between the evolved oxygen and the hydrogen, which Dr. Priestley himself experienced, as we shall presently see.

That mercury received either by inflammable air, or in close vessels, has the same properties, will not, the Doctor observes, be denied; "and if so," he says, "it must consist of the same principles, and in the same proportions, or nearly so. I am therefore inclined to think, improbable as it may appear, that the same principle which is essential to the constitution of inflammable air, that is, phlogiston, passes from the fuel through the glass when the calx is revived by heat in a glass vessel."

There is not, however, any necessity for supposing that any thing passes through the glass; for in one case, heat unites with the oxygen, which is then expelled in the form of gas, and in the other, the hydrogen unites with the same principle, and forms water.

"I have frequently," says our author, "repeated this experiment of the revival of precipitate in inflammable air, and have never failed to find a great absorption of it, whether there was any fixed air in the remainder or not; and I should have repeated it much oftener, and on a larger scale, in order to ascertain with more exactness the quantity of inflammable air, or of phlogiston, contained in a given quantity of mercury, but that it has frequently happened, that the vessels [illegible] which I made the experiments were exploded, after a sm[illegible] quantity of pure air was expelled from the calx. This accident, however, is a proof that the air expelled from the precipitate had not formed either water or fixed air. Sometimes, however, I have made the greatest part of the inflammable air to disappear without any explosion.

"Continuing one of these processes till, after the diminution, the quantity of air began to increase, there was an explosion; but it only raised the receiver in which the air was

confined

confined about an inch, and recovering its position, it broke the earthen dish in which it was placed.

"After this, I made use of a tin dish, and repeating the experiment, there was an explosion so loud, that a person at a considerable distance was alarmed, and came running to see what had happened. The receiver, which was a very heavy one, was blown much higher than my head; but falling on the grass was not broken. After this, I thought it unnecessary to make any more experiments of the kind."

These accidents shew, that the oxygen expelled from the calx does combine with the hydrogen in the usual manner, when the heat is sufficiently great.

P. 27, Dr. P. observes, "having formerly made many experiments on the revival of red precipitate in inflammable air, when I was a convert to the doctrine of the composition of water, I shall subjoin what I then observed with respect to the subject from the 6th volume of my Observations on Air, p. 128.

"'The greatest difficulty that occurred with respect to the 'theory of the constitution of water, arose from my never 'having been able to procure any water when I revived mercury 'from red precipitate in inflammable air, or at least more than 'may be supposed to have been contained in the inflammable 'air. In order to make the experiment with the scales of 'iron, and that with the precipitate, as much alike as possible, 'and that I might compare them to the greatest advantage, I 'made them immediately one after the other, and with every 'circumstance as nearly as I could the same. The inflammable 'air was the same in both the experiments, and the scales of 'iron, and the precipitate, were made as dry as possible. 'They were heated in vessels of the same size and form, and 'equally confined by dry mercury. And yet when I heated 'the former, water was formed as copiously as I have described 'it before, viz. actually running down the inside of the vessel 'in drops, though only four ounce measures of inflammable 'air were absorbed. But though I heated the precipitate till 'eight ounce measures of the air was absorbed, and only 'three fourths of an ounce measure remained, there was hardly 'any sensible quantity of water produced, certainly not one 'tenth of what appeared in the experiment with the scales of 'iron. There was this difference, however, in the two results. 'In what remained from the experiment with the precipitate, I 'at this time perceived a slight appearance of fixed air, whereas

'there

'there was none in what remained from the scales of iron. 'The residuum also from the precipitate had in it a small 'portion of dephlogisticated air. For being mixed with an 'equal measure of nitrous air, the standard of it was 1.8. In 'this experiment there can be no doubt but that the dephlo- 'gisticated air dislodged from the precipitate mixed with the 'inflammable air in the vessel; and as no water was produced, 'they must have formed some more solid substance, which in 'the small quantity I was obliged to use could not be found.'

"At this time, however, I think it more probable that nothing solid was produced, but only that the phlogiston of the inflammable air was imbibed by the calx, while the pure air emitted from it was in part found mixed with the inflammable air in the vessel, and in part united with it, and formed fixed air."

That some water is found, Dr. Priestley himself allows; and we should expect, that the quantity of this fluid, formed by the revival of this precipitate, should be less than that procured from the revival of finery cinder, because the latter contains considerably more oxygen. Dr. Maclean, however, observes, that when oxyd of mercury is revived in hydrogen gas, no oxygen gas is obtained, but a quantity of water collected: this is also agreeable to our own experience.

At page 39, the Doctor says, "On the whole, I think, it can hardly be denied, that, considering the great quantity of inflammable air that disappears in these experiments, the greatest part of it, at least, must enter into the calx. And since all running mercury must consist of the same elements, the same principle that (with the addition of water) forms inflammable air, and which we call phlogiston, must pass through the red-hot glass when the calx of mercury is revived without addition, by means of heat only.

"Some experiments that I have made on silver, gold, and platina, favour this hypothesis. All these metals yield a considerable quantity of nitrous air, when they are dissolved, the first in nitrous acid, and the two last in aqua regia. And when the solutions were evaporated, and the residuums heated in inflammable air, a great quantity of it disappeared, and the metals were revived. And yet by means of the same acids these dry residuums will yield a great quantity of nitrous air. They must, therefore, have acquired, by means of heat only, and this transmitted through a vessel not red-hot, the same principle that was communicated to them by imbibing inflammable air."

These experiments only shew, that the metals were not fully oxydated; but the imperfect oxyds were still capable of decomposing the nitric acid. There is no proof that any principle is transmitted to them through the glass. Besides, these metals part with their oxygen by the mere application of heat; their oxyds will therefore be revived, or fitted for decomposing more acid, either by hydrogen, or by the application of heat.

"That nitrous air," adds our author, "contains the same principle with inflammable air, or phlogiston, appears from the following experiment, in which the former was produced by means of the latter, if the nitrated calx of any metal be heated in it.

"If copper be dissolved in nitrous acid, and the water be expelled to a certain point, there remains a green substance, which is not at all deliquescent; but when exposed to heat gives out a red vapour. Some of this substance I heated in 21 ounce measures of inflammable air, till the vessel was filled with red vapour, when it was reduced to 6 ounce measures, and I found that when it was mixed with common air the standard was 1.35; so that it was almost wholly nitrous air. There was in it a small quantity of fixed air, but there was nothing inflammable in it. It extinguished a candle."

In this experiment, the hydrogen uniting with part of the oxygen of the nitric acid, (for the salt was nitrate of copper,) formed water, while the nitric acid was reduced, by being deprived of its oxygen, to the state of nitrous gas.

The seventh section is on the *decomposition of water*, which seems a recapitulation, and contains nothing different from what the author has before brought forward. We shall, however, present our readers with the following extracts. Speaking of the antiphlogistians, our author says:

"Their proof that water is decomposed, and resolved into two kinds of air, is, that when steam is made to pass over red-hot iron, inflammable air is produced, and the iron acquires an addition of weight, becoming what is called finery cinder, but what they call oxyd of iron; supposing that there is lodged in it the oxygen which was one of the constituent parts of the water expended in the process, while the other part, or the hydrogen, with the addition of heat, assumed the form of inflammable air.

"But in order to prove that this addition of weight to the iron is really oxygen, they ought to be able to exhibit it in the form of dephlogisticated air, or of some other substance into which oxygen is allowed to enter, and this they have not done.

Iron

Iron that has really imbibed air, or the common rust of iron, has a very different appearance from this finery cinder, being red, and not black; and when treated in similar processes exhibits very different results. Mr. Fourcroy says, that this finery cinder is 'iron partially oxygenated.' But if that were the case, it would go on to attract more oxygen, and in time become a proper rust of iron, completely oxygenated. But this is so far from being the case, that, as I have observed, finery cinder never will acquire rust; which shews that the iron in this state is saturated with some very different principle, which even excludes that which would have converted it into rust.

"However, neither this, nor any other calx of iron, can be revived unless it be heated in inflammable air, which it eagerly imbibes, or in contact with some other substance which has been supposed to contain phlogiston. The probability therefore is, that the phlogiston then enters this calx of iron, replacing that which had been expelled to form the inflammable air Nor can any inflammable air be procured in this process with steam, but by means of some substance which has been supposed to contain phlogiston. Where, then, is the certain proof that water is decomposed in this process?

"Since, according to the antiphlogistic theory, water itself contains all the elements of both dephlogisticated and inflammable air, and wants only calorique, which they can give at pleasure, I see no reason why heat alone, without the aid of any metal, might not convert it into air. When the particles were so far separated as they are in a state of steam, I see no occasion for the superior attraction of any other substance for either of them. In steam each of the elements is already in the form of air, and with its due proportion of calorique, and then why should they not continue in that form, only mixed together, ready for explosion?"

After what has been already said, we trust that our readers will think any remarks on the above unnecessary. With respect to the latter part, however, it may not be improper to observe, that the volatile alkali, (ammoniac,) which is composed of azote and hydrogen, may be easily volatilized by heat, and still its component parts are not separated from each other. In the same manner we can easily conceive the particles of water, each of which consists of oxygen and hydrogen, to be separated from each other by caloric, without being decomposed.

The Doctor afterwards says, that when he exploded very pure oxygenous

oxygenous and hydrogenous gases, he procured a highly phlogisticated and concentrated nitrous acid. This is certainly contrary to our experience, and that of other chemists. Indeed he afterwards observes, that "if there be a redundancy of inflammable air, in this process, no acid will be produced, but in place of it, there will be a quantity of phlogisticated air, together with water." Now this is exactly what we should expect to take place; it is extremely difficult to procure the gases pure; some portion of azotic gas being mixed either with one or both of the others: if then the hydrogen should not be sufficient in quantity to saturate the oxygen, part of the azote will enter into combination with it, and nitrous or nitric acid will be formed; but should the quantity of hydrogen be greater, then no acid will be formed, but a quantity of azotic gas will remain.

In the eighth section, Dr. P. brings forward some arguments against the decomposition of water, from the different proportions of the elements of which it is supposed to consist, deduced from different experiments. "According to the new theory," he observes, "water consists of two principles, oxygen and hydrogen; and they are separated by iron, or charcoal, in a red heat, uniting with one of them, and suffering the other to escape; and therefore, if in any case a quantity of water be wholly expended in forming air, and only one of the kinds be found, it will be evident that this water does not consist of two elements. Now according to one of my experiments, water would appear to consist of only one of the kinds of air, and according to another of the other.

"I have shewn that by a slow supply of water, in sending steam over red-hot charcoal, the whole of the produce is inflammable air, without any mixture of fixed air, or the production of any thing, aërial, fluid, or solid, into which oxygen can be supposed to enter. From this experiment, therefore, conducted in this manner, it might be concluded that water consists of hydrogen only, without any oxygen.

"This observation of mine is confirmed by Mr. Watt, whose accuracy no person will call in question. He says, in his Description of a pneumatical Apparatus, subjoined to Dr. Beddoes's Considerations on the medicinal Use of factitious Air, p. 84, 'It has been observed by Dr. Priestley, and confirmed by my experience, that when much water passes in the form of steam, there is much fixed air formed; but little or none when the water is admitted so sparingly that no steam reaches the refrigeratory'."

There

There can be little doubt that the inflammable air procured in these experiments, consisted of a mixture of hydrogen gas, and gaseous oxyd of carbon; indeed Mr. Watt's experiment tends strongly to confirm this opinion; for when the water passed over plentifully, it would afford an abundant supply of oxygen to the charcoal, and convert it into fixed air, (carbonic acid;) but when it was more sparingly admitted, gaseous oxyd of carbon would be formed. The Doctor, however, thinks that "the reason why more fixed air is produced, when the supply of water is copious, is, because more water is necessary to the constitution of fixed air than to that of inflammable air."

"According to this experiment with charcoal," he observes, "water may be shewn to consist of hydrogen only; but according to my experiment with terra ponderosa aërata, it may be proved to consist of oxygen only. For when steam is sent over this substance in a red heat, nothing but the purest fixed air is produced; and yet the whole of any quantity of water may be expended in that production. As water is not said to contain any carbon, this must be supplied by the terra ponderosa, and all the oxygen by the water. For, according to the theory, fixed air consists of 28 parts of carbon, and 72 of oxygen."

The carbonic acid, in this instance, evidently comes from the carbonat of barytes; the water is probably absorbed by the barytes, and fixed in it as it is by lime.

Page 52, the Doctor says, "To my experiments with the terra ponderosa, which, in my opinion, demonstrably prove that water is a constituent part of fixed air, and therefore probably of other kinds of air also, Mr. Berthollet objects (Report, p. 82,) that I did not examine the loss of weight in this substance. But after the process, it adhered so closely to the earthen tube in which the experiment was made, that the loss of weight could not be ascertained with accuracy. This, however, was not at all necessary. I found very exactly how much fixed air a given quantity of this substance would yield by means of water, which appeared to be the same that it yielded by solution in marine acid, and that it yielded no air at all by mere heat without water. It was quite sufficient, therefore, to find how much water was expended in procuring any quantity of fixed air from this substance. And as there was no other source of loss of water besides the fixed air, it could not but be concluded, that it entered into its composition, as a necessary part of it, and in the proportion which I ascertained."

That

That the carbonic acid here procured was contained in the carbonat of barytes, appears from its being the same in quantity, as what may be expelled by muriatic acid. The same quantity, or very nearly, may likewise be expelled by the application of heat, notwithstanding our author's assertion to the contrary. That water is not a constituent part of the air, appears from Mr. Rupp's experiments, which we mentioned in the last number, p. 7.

In the ninth section, Dr. P. proceeds to notice the supposed decomposition of water in the experiments of Van Troostwick and Deiman, those of Mrs. Fulhame, and various other processes.

"It is alleged," he observes, "in favour of the decomposition of water, that both dephlogisticated and inflammable air have been procured by taking electric explosions in water. Experiments with this result were made by Messrs. Van Troostwick and Deiman, and have been repeated with the greatest attention by Dr. Pearson. See the Philosophical Transactions for 1797, p. 142.

"The accuracy of these experiments I am by no means disposed to question. Both dephlogisticated and inflammable air were, no doubt, produced, though with infinite labour, by this means; and I consider the experiment as exceedingly curious and important in several respects. But it is a very complex one. Several agents are concerned, and what, and how much, to ascribe to each of them, it is not easy to say. I have not yet found any termination to the production of air from water only; and the last product, which is equable, is wholly phlogisticated air, of the nature of which we know but little. Some of my experiments seem to prove that it is composed of dephlogisticated and inflammable air; and light, which is peculiarly intense in the electric spark, is, in my experiments on plants, and probably in other processes, a necessary agent in the production of dephlogisticated air, when there is water for its basis. And the metals that are employed, viz. gold and platina, may contribute to this slow production of inflammable air. But the accension of these airs being sometimes spontaneous, without the electric spark being taken in them, shews that part at least of the air produced is phosphoric; and it is well known that the electric spark is always accompanied with the smell of phosphorus."

The effects of the galvanic influence and electricity, which appear to be one and the same, upon water, are certainly curious, and difficult to explain in the present state of our

 knowledge.

knowledge. It is now known, that if the galvanic influence, produced by means of a pile composed of pieces of zinc and silver, be conducted to a quantity of water, by two wires of difficult oxydation, *e. g.* gold or platina, a current of hydrogen gas will rise from the wire connected with the silver side of the pile, and a current of oxygen from that connected with the zinc side. If these gases be received in separate tubes, the bulk of the former will be to that of the latter nearly as two to one, or in the same proportions that they exist in water, while the water will gradually diminish, and at last disappear. The same effect may be produced by sending a strong stream of electricity by means of two very small platina wires through water.

In reflecting on these experiments, it would appear that the water is decomposed; but how this is effected, cannot, perhaps, easily be explained; for we cannot well conceive how the oxygen should pass silently from the extremity of the silver wire to that of the zinc wire, and there make its appearance in the form of gas. We may, however, be allowed to observe, that though, in the present state of our knowledge, we cannot explain all the phenomena in a satisfactory manner, yet this should be regarded, more as owing to a want of knowledge of some minute links in the chain, than as a solid objection to the doctrine. Suppose that Newton had contented himself with explaining the motion of the heavenly bodies by the theory of gravity, but had not extended his explanation to the tides; and that some philosopher possessed of less acute reasoning powers, after having endeavoured in vain to account for this phenomenon on the principles laid down, might perhaps say that Newton's doctrine of gravitation was false, because he could not by it explain the phenomena of the tides: should we not say that he reasoned unphilosophically? Our not being able to explain some phenomena by means of any general principle, ought to make us view that principle with a cautious eye, but should form no objection to its truth, provided our theory be established by a cautious and broad induction.

At page 56, the Doctor says, "It is pretended that water is decomposed by the growth of plants acted upon by light. But if this was the case, why will not a plant continue to grow in the same water till the whole of it be decomposed? Whereas I always found that only a certain quantity of dephlogisticated air could by this means be procured in the same water, and very little in proportion to its bulk. After this the production of air ceased, and the plant died."

The reason why most plants will not live in pure water, is,

because they have need of carbon as well as water for their nourishment; but if the water be supplied with carbonic acid, or oxyd of carbon, which latter is contained in water that runs from a dunghill, the plant will continue to live.

Page 58. "Since charcoal is resolvable by means of water into fixed and inflammable air, and fixed air consists of dephlogisticated air and phlogiston, these principles have been united in the ingenious experiments of Mr. Tenant, diversified by Dr. Pearson, so as to form charcoal. It was accomplished by heating substances containing fixed air, as marble, &c. together with phosphorus, which contains phlogiston. This experiment has been alleged in favour of the decomposition of water; but I only see in it the composition of a substance from the elements of which it was known to consist."

This experiment was never, as far as we know, regarded as a proof of the decomposition of water, but of the carbonic acid; though it certainly bears considerable analogy to the decomposition of water; for there the oxygen is taken up, and the hydrogen set at liberty; while, in this experiment, the oxygen is attracted by the phosphorus, and the carbon disengaged.

Our author proceeds to say, "The production of inflammable air from liver of sulphur with water, Mr. Gingembre says, arises from a decomposition of this water; because without the water no inflammable air is procured. But water, I find, is necessary to the constitution of all kinds of air, and of inflammable air most evidently.

"Mrs. Fulhame imagines, that she has proved the decomposition of water, from a number of exceedingly curious experiments on the revival of metals by means of inflammable air, phosphorus, sulphur, charcoal, and various other substances of a similar nature, because the effect is never produced without the presence of moisture. Her experiments are such as I should not have expected à priori; and when she was so obliging as to shew me the result of some of them in London, I was greatly struck with them; but I do not think that they prove the decomposition of water."

After what has been already said, it will, we presume, be unnecessary to add any thing in support of Gingembre's explanation, which is very simple and natural. With respect to Mrs. Fulhame's experiments, water seems to have been necessary merely to facilitate the union of the combustible body with the oxygen of the metallic oxyd; for this fluid does not appear to have been decomposed in any instance; but, on the contrary, formed where hydrogen was used. In

In the ninth section, *On the Constitution of fixed Air*, Dr. P. says, "There is no metal that I have ever heated with a burning lens over lime water in atmospherical air, without producing a thick scum on its surface, which was, no doubt, lime, formed by the quicklime in the water, and the dephlogisticated air contained in the portion of atmospherical air, in which the process was made. For this purpose, I have tried not only iron and zinc, which are said to contain plumbago, (a kind of carbon from which some fixed air may be expelled,) and also lead, tin, bismuth, copper, &c. as observed before, but even gold, silver, and platina; and it will hardly be pretended that all these metals contain carbon."

The carbonic acid probably existed in the atmospheric air, and its union with the lime was perhaps facilitated by the heat applied.

"From a quantity of calx of lead," he adds, "part gray and part yellow, in a glass tube, I got its bulk of almost pure fixed air, and the residuum extinguished a candle. Where could be the carbon in this case?"

The fixed air had probably been absorbed by capillary attraction, and was now given out on the application of heat: it is well known, that dry porous substances will absorb a greater quantity of air than their bulk.

Page 62, he says, "Fixed air is always produced when iron is melted, and thereby converted into finery cinder, in atmospherical or dephlogisticated air, and also when some kinds of inflammable and dephlogisticated air are fired together. But Mr. Berthollet, Mr. Adet, and all my opponents, say that this fixed air comes from the plumbago contained in the iron, and that when it is found after the union of inflammable and dephlogisticated air, in an explosion of them, it was from plumbago contained in the inflammable air. But besides that there is no evidence of inflammable air containing any plumbago, (since, when iron is dissolved in any acid, the plumbago is left behind,) the fixed air contained in this substance, of which the antiphlogistians make so much use, is very inconsiderable; the air into which it may be resolved being chiefly inflammable."

Iron contains plumbago, which is a carburet of iron; the oxyd of carbon is easily converted into carbonic acid by absorbing oxygen from the atmosphere; and this will account for the "fixed air produced when the iron is melted." The gaseous oxyd of carbon is most probably the inflammable gas, which, when fired with dephlogisticated air, produces fixed air.

X 2 From

From 6 dwts. of the purest plumbago, procured from an iron furnace, in the form of a shining black powder, the Doctor expelled, in a glazed earthen tube, 40 ounce measures of air; one twelfth part of which was fixed air, and the rest inflammable, burning with a blue flame. Then, sending steam through the tube, he got 240 ounce measures more, the whole of which was inflammable air, of the purest kind, exactly resembling that from iron, by the vitriolic acid. The plumbago was converted into one mass, resembling a hard cinder, and weighed 2½ dwts.

The gases procured in the first part of this experiment would be chiefly carbonic acid and carbonic oxyd; this would render the iron more pure, by freeing it from the carbon and oxygen; in this state it would decompose water, and set at liberty its hydrogen, which would assume the form of gas.

In the eleventh section, phlogisticated air (azotic gas) is considered. "One decisive proof," our author observes, "that phlogisticated air may be formed, and seemingly by the union of dephlogisticated air and phlogiston, is the quantity of phlogisticated air that remains, after any explosion of dephlogisticated or common air, with inflammable air, more than what remains after the mixture of nitrous air with either of them.

"Having procured a quantity of dephlogisticated air so pure, that one measure of it, mixed with two measures of nitrous air, was reduced to 0.04, I could not by any mixture of the purest inflammable air fired along with it, reduce it to less than 0.25."

The oxygen, though comparatively pure, still appears to have contained some azot, which would probably enter into combination, or be absorbed by the nitrous acid formed; but when hydrogen gas was used, water would be the product, and the azotic gas would remain. This will account for the greater residuum with inflammable than with nitrous air.

Page 69, our author says, "Since pure nitrous air wholly vanishes when it unites with pure dephlogisticated air, the phlogisticated air that is found after heating iron in it, cannot be a simple element, but must have been formed from something in the nitrous air, and phlogiston from the iron. Heating malleable iron in 60 ounce measures of nitrous air, it was reduced to 24, all phlogisticated."

Though we have some doubt of azot being a simple substance, yet, in this instance, the nitrous gas was evidently decomposed by the iron, which absorbed its oxygen, and left the azot in the form of gas.

"Since

" Since water," he adds, " contains but a small quantity of air in proportion to its bulk, and generally considerably purer than that of the atmosphere, the phlogisticated air that is produced by heating steam in a copper vessel must have been formed from phlogiston in the copper, and the air contained in the water; and whenever I have heated water in this manner, (the upper part of a closed copper tube being kept in a red heat, while the lower and open part was immersed in water,) I have found a considerable quantity of air completely phlogisticated; and the longer I kept it in this state, the more of this air I found."

In this instance, the copper seems to have absorbed the oxygen of the atmospheric air contained in the water.

" It is well known," says the Doctor, " that hot charcoal imbibes any kind of air; and I have observed, that when it is afterwards put into water, it gives this air out again. But if the air be that of the atmosphere, it takes the dephlogisticated part in preference to the other, leaving the remainder phlogisticated; and the air that it gives out after this in water, is chiefly phlogisticated. What, then, becomes of the dephlogisticated air that has disappeared? Will it be said that it remains in the charcoal, which had imbibed it? Whence then came the phlogisticated air which it gave out, when, according to the new theory, charcoal does not contain any such principle? It is not found in the water into which it is put; for this gives out air less pure that it did before the process."

Hot charcoal absorbs atmospheric air, the oxygen of which combines with the charcoal, so that nothing but azotic gas can be expelled by water; on increasing the heat, carbonic acid or gaseous oxyd would be expelled.

" A solution of copper in volatile alkali," he observes, " gave phlogisticated air with marine acid, and it will not be easy to say where this azot existed before the process." The Doctor does not seem to recollect, that azot is a component part of volatile alkali.

Page 71. " Most of the substances which have been used to phlogisticate air, gain an addition to their weight in the process, in consequence of which it has been taken for granted by the antiphlogistians, that nothing is emitted from them, and that they only imbibe the dephlogisticated air, which is one constituent part of the atmosphere, leaving the other part, which they call azot, unaltered. It was, therefore, desirable to find some substance, which would not gain any weight in the process, and yet have the same effect in phlogisticating the air. For the

the dephlogisticated air not uniting with the substance exposed to it, must necessarily form some other combination.

"This end was in some measure answered by steel, which, according to the common hypothesis, containing more phlogiston than iron, would, I thought, part with more on the application of heat, and receive less addition; and this I found to be the case. But it was more completely answered by black bones, which, without gaining any thing by the application of heat in any circumstances, became white in the process.

"If this be done in common air, as the bones do not imbibe the dephlogisticated air that disappears, this air is disposed of in two different ways. For one part of it contributes to form fixed air, and another part may form a different union with something emitted from the bones, and make an addition to the phlogisticated air. Accordingly, there is more of it found after the process with the black bones than with iron, and many other substances which receive an addition of weight in the process.

"Whence, then, I ask, can come this addition of phlogisticated air, but from an union of phlogiston emitted from the bones, and the dephlogisticated air in the atmospherical air to which they are exposed? Consequently, phlogisticated air, or azot, is not a simple substance, as the antiphlogistians maintain, but a compound. Also whence can come the fixed air that is procured in the same process, but from a different combination of the same elements, and not, as they say, from carbon, which is a substance of vegetable origin, and has no place here?"

Steel being a carburet of iron, it is evident, that the carbon will first unite with the oxygen, and form carbonic acid, which will mix itself with the atmospheric air, and prevent its bulk being diminished. Carbonic acid will likewise be formed by the black bones, and, in this case, there will be no diminution of the bulk of the air; on the contrary, we can easily conceive, that some azot, which enters into the composition of animal substances, may be given out.

Our author concludes his work, by observing, that "before the new theory of chemistry can be unexceptionably established, the following things must be done:

"1. Whenever inflammable air, or hydrogen, is procured, evidence must be given of the production of a due proportion of oxygen, that is, of 85 parts of this to 15 of the other; and this evidence must be something more than an addition of

4 weight.

weight. It must be either actual acidity, or dephlogisticated air. Otherwise there is no proof of the inflammable air having come from the decomposition of the water. This, however, has not been done with respect to iron, or any other substance by means of which inflammable air is procured.

"2. When water is procured by the burning of inflammable air in dephlogisticated air, not only must the water be free from acidity, but there must have been no production of phlogisticated air in the process. For by the decomposition of this air, the nitrous acid may be procured."

With respect to the first objection, it has been proved, in the most satisfactory manner, that the substances by which water is supposed to be decomposed, are converted into oxyds, or undergo the same change that they would have done, if combined with oxygen in any other way, such as combustion in oxygen gas. This being considered, and likewise that the addition of weight is exactly equal to what the water loses, we cannot avoid thinking the evidence sufficiently satisfactory. With regard to the second objection, there is no doubt that the water would not only be free from acidity, but no azotic gas would remain, provided the oxygenous and hydrogenous gases employed were perfectly pure.

We have attempted to repel the principal objections which this celebrated philosopher has advanced against the new system of chemistry. How we have succeeded, our readers will decide; we can only say, that we have no other object in view in this controversy, than truth; that Dr. Priestley is actuated by the same motive, we never for a moment doubted: for though we may differ in opinion from him on this and other points, we are convinced of his integrity and good intentions. We cannot, however, help observing with Berthollet, and the other authors of the Report on the examination of Mr. Kirwan's book, that if we doubt of a truth established by experiments so simple and palpable as those which demonstrate the composition of water, there would be nothing certain in natural philosophy. We might even question whether vitriolated tartar be composed of vitriolic acid and fixed alkali, or sal ammoniac of marine acid and volatile alkali, &c. &c. For the proofs we have of the composition of these salts, are of the same kind, and not more rigorous than those which establish the composition of water.

In an appendix, the author gives a short account of Dr. Mitchell's attempt to reconcile the two systems, which we think with Dr. P. will hardly be admitted by either of the contending

contending parties. He likewise asserts his claim to the discovery of the production of dephlogisticated air by the action of light on plants, which has been often attributed to Dr. Ingenhousz. We are glad likewise to find him asserting his right to the very important discovery of oxygen gas, which indeed we never doubted. Lavoisier certainly had the merit of erecting the fabric of pneumatic chemistry, or at least of furnishing the design; but the most valuable of the materials were undoubtedly provided by Dr. Black, Dr. Priestley, and Mr. Cavendish.

Lavoisier, in his Elements of Chemistry, speaking of oxygen gas, says, "this species of air was discovered almost at the same time by Mr. Priestley, Mr. Scheele, and myself." Dr. Priestley, however, states the case as follows:

"Having made the discovery some time before I was in Paris in 1774, I mentioned it at the table of Mr. Lavoisier, when most of the philosophical people in the city were present; saying that it was a kind of air in which a candle burned much better than in common air, but I had not then given it any name. At this all the company, and Mr. and Madame Lavoisier as much as any, expressed great surprise. I told them that I had gotten it from precipitate per se, and also from red lead. Speaking French very imperfectly, and being little acquainted with the terms of chemistry, I said plomb rouge, which was not understood till Mr. Macquer said I must mean minium. Mr. Scheele's discovery was certainly independent of mine, though I believe not made quite so early."

Art. V. Duncan's *Annals of Medicine for the Year* 1800; *Vol. V.*

(Concluded from page 81.)

In our last Number we presented our readers with the analysis of the first part of this work; we shall now proceed to lay before them the second part, which consists of original medical observations.

The first article is the

History of a Case of Convulsions during the latter Month of Pregnancy, with practical Remarks on Convulsions during Pregnancy and Labour. By James Hamilton, jun. M.D. Professor of Midwifery in the University of Edinburgh.

The following is an abstract of this interesting case:

A lady,

A lady, of 25 years of age, seven months gone with child, was seized with violent convulsions on the morning of December 24, 1799; and when the author saw her, she was "nearly insensible, with an oppressed slow pulse, the pupils of the eyes greatly dilated, the lower extremities much swelled from anasarca, and without any symptoms whatever of approaching labour." On inquiry, he learnt, that her limbs had been swelled for above a fortnight, and that on the day preceding his visit she had complained much of headach. During the night she had been restless and sick. Her bowels had for some weeks been rather constipated.

She was bled, but during the bleeding had a violent fit, and the superior extremities began to swell, so as to prevent the blood from flowing; leeches were applied to the temples, and the bowels were emptied by a glyster. Another fit came on in an hour, and her face then became tumid. The head was shaved, and a large blister applied. There was much stertor and restlessness during the intervals of the fits, which were short; but on the morning of the 25th, when the blister began to discharge, those symptoms ceased, and the fits became less frequent.

In the following morning, as the fits were rather more frequent, a blister was again applied to the head, and ten drops of saturated tinct. of digitalis ordered every half hour, till a copious discharge of urine should be produced, which occurred, after some sickness and vomiting, in eight hours, at which time the fits ceased, and the swelling of the face and the upper extremities subsided.

The camphor julep was given her, and on the morning of the 26th, she had a powerful dose of calomel and jalap. On the 28th, she had some pain of the head and a slight return of the swelling of the upper extremities, on which the camphor was omitted, and the tinct. of digitalis given in the dose of ten drops every hour. In the evening she had a copious discharge of urine, which removed these symptoms, and camphor was given for some time at bedtime.

She was delivered of a dead child in a fortnight, and by the help of bark and valerian, country air and exercise, after some time, recovered her usual health.

In the remarks suggested to him by this case the author censures Dr. Cullen for rejecting the distinction between *eclampsia* and *epilepsia*, and wishes to retain the former as exclusively belonging to this species of convulsive disorder of

 puerperal

puerperal women, which he considers as always having an acute and inflammatory type.

It differs, he thinks, from *epilepsy* in several important particulars. In eclampsia, he observes, that the symptoms preceding the attack are well marked to the experienced practitioner; that the first fit, if no remedy be applied, nor delivery take place, is in a few hours followed by other paroxysms; that after these attacks, and during the intervals, the patient remains quite sensible, and even, in some instances, the sensibility is increased; that the aura epileptica never occurs; and that the pulse is always affected even during the intervals, being generally slow and oppressed.

The difference between this disease and hysteria is still more obvious, as the latter, besides being of comparatively rare occurrence in pregnancy, is attended with well-marked globus, and does not exhibit that frothing at the mouth, strong workings of the tongue, and hisping noise, as if from the retraction of the saliva, which take place in eclampsia. Neither can the convulsions which follow profuse evacuations, and generally are the harbingers of death, be confounded with eclampsia.

The symptoms which precede the paroxysm in this disorder, are of consequence for every practitioner to be aware of. Dr. H. enumerates the following: "they consist of violent lancinating pain in the head, or in the stomach, in which latter case there is deadly sickness, impaired or depraved vision, tinnitus aurium, deep sighing, and low delirium. The most ordinary combination of these symptoms is pain in the head, tinnitus aurium, and dimness of sight, or the sensation of fire flashing before the eyes. This combination is common to the disease, both during pregnancy and labour. But pain in the stomach, with deadly sickness, and a kind of crampish sensation, is peculiar to convulsions during pregnancy, and deep sighing and low delirium precede the disease only where it occurs during labour. There is another symptom which takes place exclusively under the latter circumstance, and that is violent shivering. When this happens during the second stage of labour, and is preceded or succeeded by great irregularity of the pulse, convulsions inevitably follow, if proper means be not speedily adopted to prevent them."

Among the *predisponent causes* of this disease, the author particularly mentions pregnancy, (notwithstanding this has been denied by Dr. Bland,) which he supposes to have the effect of producing it, from the united operation of an habitual increase

increase of the formation of blood, necessary for the nutriment of the fœtus as well as the mother, and at the same time an obstruction, or tendency thereto, in the lower arteries of the body, from the pressure of the gravid uterus; both of which circumstances throw an unusual quantity of blood upon the vessels of the head. He admits, however, the operation of irritations in the primæ viæ, and increased susceptibility to impression in the nervous system, as other predisposing causes. Among the exciting causes he is of opinion, "that passions of the mind, pressure of the uterus, and the protraction of violent labour throes, are of the most frequent occurrence."

The *proximate cause* of this disease the author decidedly asserts to be a determination to the head; and this, he thinks, is to a considerable degree confirmed by dissections, which have constantly shewn a congestion in the vessels of the brain, very seldom, however, productive of rupture. The *method of treatment* which he recommends, is, in many respects, similar to that laid down by Dr. Denman, but with some important variations. On the propriety of blood-letting, both general and topical, from the jugulars or the temporal artery, no doubt is entertained by either of these eminent practitioners; but the author likewise recommends the patient to take camphor in doses of ten grains every three or four hours, as soon as the power of swallowing returns. He employs it suspended in boiling water by means of alcohol, sugar, and magnesia, and requires it to be persevered in for several days. He considers it the most valuable internal remedy prescribed in such cases.

When the disease has been preceded by œdema, the use of digitalis may be fairly tried, and the case given by the author is a favourable testimony to its efficacy. His opinion concerning opium (a medicine recommended by Drs. Denman and Bland) is deserving of attention. "In every case of true eclampsia," says he, "during pregnancy or labour, opiates do irreparable mischief, where a copious bleeding has not been premised; and even where that precaution has been attended to, they have been found useless, if not hurtful. Melancholy experience has completely established in my mind this practical precept; and I consider it to be a matter of very great moment, that it should be universally known."—"I can solemnly declare, that no patient to whose assistance I have been called, who had taken a dose of opium previous to my arrival, has recovered, and I have known that medicine given in almost every variety of dose."

 Convulsions

Convulsions during labour should be treated upon the same principles, "with these additional precautions, that delivery is to be accomplished by the most expeditious possible means; and that if the delivery be followed by uterine hæmorrhagy, the discharge is for some time to be rather encouraged than checked."

Vomiting, the warm bath, and dashing cold water by surprise, though they have been recommended by practitioners of eminence, the author's experience does not justify him in employing.

We cannot entirely agree with the author in his idea of the proximate cause of this formidable disorder, which, were it just, would render it a much commoner occurrence than it is found to be. Dr. Denman lays considerable stress on the habits and mode of life of women in large and crowded towns, as tending to occasion convulsions in pregnancy; but as Dr. Hamilton asserts, that this disease is met with in very different situations, we are disposed to think, that the cases which occur in North Britain may, perhaps, have more of an inflammatory nature than the others, and consequently will require a different mode of treatment. The extreme danger of the attack unfortunately appears to be equally urgent in every part.

In noticing the opinions of Dr. Denman, our author seems to have deviated from his wonted accuracy, owing to the idea which he has formed on the proximate cause of the disease, when he says, that "it must have been under such circumstances," (cramps in the stomach without hæmorrhage,) "and not in true eclampsia, that Dr. Denman found the auricles and ventricles of the heart quite empty of blood." Dr. Denman certainly gives no reason for such a supposition; for after describing symptoms very similar, even in expression, to those mentioned by the author, he gives the usual appearances on dissection, in which we find symptoms of that determination to the head, which the author considers as the proximate cause of this disease. The Doctor's words are: "In the examination of many women who have died in convulsions, I have never seen an instance of effusion of blood in the brain, though the vessels were *extremely turgid*; but it is remarkable, that in all, the heart was unusually flaccid, and without a single drop of blood in the auricles or ventricles."

The author, too, speaks of Dr. Denman's adopting the opinion of the translator of Astruc, who, in strong terms, asserts the efficacy of opium in such cases: Denman, on the other

other hand, though he favours the use of opium, and says it has sometimes been given with evident advantage; yet he adds, that he has seen many cases, in which it had no power to remove, or even to abate, this disease.

2. *Observations on the Use of the Argentum Nitratum in Chorea Sancti Viti and Epilepsy.* By Dr. Thomas Hull, Physician, Retford.

This communication is a supplement to one that was inserted in the Annals for 1799, in which it is mentioned, that the patient, whose case was given at length in the former volume, continues well; but it seems she still uses the argentum nitratum regularly to a considerable extent. The sickness, languor, and affection of the urinary organs, which occurred on first using the nitrated silver, have disappeared.

In another case Dr. H. has been able to increase the dose to three quarters of a grain daily, without occasioning the sickness, nausea, and vertigo, which follow an over-dose of this violent remedy.

3. *Letters on the yellow Fever, addressed to Joseph Wilson, Esq. American Consul.* By Dr. William Drennan, Physician, Dublin; and Dr. William Patterson, Physician, Londonderry.

The first letter, that from Dr. Drennan, suggests a method of extinguishing the contagion of the dreadful pestilence which has ravaged some of the most flourishing towns in the Transatlantic continent. After some observations on the expediency of the executive government of America offering rewards to the scientific men of all nations for the discovery of a remedy for the yellow fever, the author enumerates some of the methods of destroying or decomposing the forms of contagion which have been put in practice; to which he adds, "it seems to me that the most penetrating and most powerful decomposer is the simple element of *heat*; and that other fluids are indebted to this one for their apparent effect as alteratives or neutralizers of contagion."

The author then proceeds to observe, that there is a certain point in the scale of temperature peculiarly favourable for the propagation of contagion; but that the seeds of distemper remain inert, and finally lose their prolific power, if kept in a temperature much *above* or *below* the propagating point. The analogy with the seeds of the vegetable kingdom and the ova of animals here obviously suggests itself to the author. He likewise mentions, as a well-known fact, that in the countries of the Levant, the appearance and continuance of the plague is

much determined by season; so that in Constantinople, it is terminated by the cold of winter, and in Cairo, by the heat of summer. Agreeably to these ideas, Dr. D. proposes to extinguish the contagion of yellow fever when it has infected any house or apartment, by heating the room and every thing to which the infection can cling, by means of a portable furnace, to a temperature as high as could be allowed of without destroying the articles to be purified. He proposes the experiment to be made in this country, whenever the puerperal fever shall make its appearance in the wards of any lying-in hospital.

In the succeeding letter, Dr. Patterson appears to us successfully to combat the opinions of Dr. Drennan, that the origin of the yellow fever is an inquiry of little importance; he intends, however, in a future letter, to examine the expedient proposed by Dr. Drennan for extinguishing febrile poison by the agency of heat.

4. *Observations on cold Applications to the Head in Cases of Insanity.* By Dr. R. Hall, formerly of Jedburgh, now Physician in London.

The object of the author, in this short communication, is to add his testimony to the frequent beneficial effects produced by this simple but powerful application, which has long been received by practitioners, and is occasionally resorted to. With regard to the cases which have fallen under the author's notice, he observes, that "cloths dipped in the coldest water, or artificially rendered so, after being gently wrung, were kept constantly applied to the head, and renewed as they acquired heat, until a sense of cold and chilliness were induced, and propagated over the whole system, which seldom failed to produce relief, and prove the harbinger of returning rationality; after which, for the most part, an occasional recurrence to this remedy was only found necessary. In one or two of the cases, the patient complained much of an uneasy sense of weight on the crown of the head, upon the first application of the wet cloths, and could hardly be induced to tolerate it; by degrees, however, this sensation wore off, and he became sensible of its utility. Not unfrequently, this mode of applying cold to the head was interchanged with the effusion of cold water, out of an appropriate vessel, and from a considerable height."

Dr. H. likewise suggests the use of other more evaporable fluids, on the idea that the evaporation from the surface of the head is a principal source of the benefit derived from this practice. The well-known effect of ether topically applied in acute

acute headach will, perhaps, be an additional sanction to the experiment.

5. *Account of a Method employed in Bengal for the Cure of the cutaneous Disease, commonly known by the Name of Ringworms, (the Herpes Serpigo of Sauvages,) by means of Cassunda Vinegar.* By Dr. Adam Freer, on the Bengal Establishment.

This disorder, the *ringworms*, called by the natives *daad*, Dr. F. observes, is extremely tormenting during the rainy season, and particularly affects Europeans. It makes its appearance on the thighs, and sometimes spreads over the trunk of the body, neck, and face, obstinately resisting the common remedies in cuticular affections, as preparations of lead, sulphur, and even mercury. From the recommendation of Mr. James Champain, of Patna, Dr. F. employed in this disease a decoction in vinegar of a common shrub, the cassunda *(cassia sophera Linn.)* "Since that time," he observes, "I have used, with the best success, an ounce of the fresh bark, roots, tops, or flowers of the cassunda, cut small and boiled with a pint of good wine-vinegar, in an earthen vessel, to eight ounces. This vinegar, when cooled and strained, is to be kept for use in a glass bottle well stopped. A drachm or two of the vinegar thus prepared, and applied to the parts affected two or three times a-day, washing with soap and water, and drying the parts with a towel previous to each application of the vinegar, is generally sufficient to remove the disorder. This vinegar may be kept for a year without any sensible diminution of its virtues.

"It has been observed, that the cassunda vinegar does not always prevent a return of the complaint in the succeeding year, and that sometimes cases do occur, so obstinate and inveterate, as to be little affected by it. I have met with very few of these cases; but when they do occur, a purgative occasionally repeated for three or four times, a vegetable diet, the daily use of cows-whey, and a calomel pill every night at bedtime, soon remove the disorder.

"Although it be not always necessary, perhaps a bleeding, the warm bath, and a course of the diet mentioned, before the use of the cassunda in any form, is advisable."

6. *Account of the Employment of very large Quantities of the Ærugo Æris, exhibited internally to a Horse with a View to the Cure of the Glanders.* By Mr. Robert Lawson, Surgeon to the Oxfordshire Light Dragoons.

This formidable and highly-infectious disease is an inflammation

mation and ulceration of one or both nostrils, which gradually extends over the septum narium, and yields a fetid ichorous discharge. The use of verdigris having been recommended by a professor in the veterinary art, Mr. L. gave this medicine a trial in two cases, a horse and a mare, beginning with one drachm daily, and gradually increasing it to one ounce. No apparent effect was produced either for better or worse for nearly three months, at the end of which time the horse was shot as useless. Dissection shewed no disease in the brain, but it was entirely confined to the septum of the nose and nostrils. The verdigris had produced no apparent inflammation on the stomach and alimentary canal.

The mare was kept nearly six months on the same remedy, but with no better effect.

7. *Cases of Patients treated at the Dispensary and lunatic Asylum at Montrose.* By Dr. James Ross, one of the Physicians to the Montrose Dispensary and Asylum.

The first is a case of hæmoptysis terminating successfully under the use of nitre and opium; the second, a case of paralysis of the right arm removed under the use of electricity. On the latter we would observe, that not only was electricity employed, (to which the author attributes the cure,) but bark, valerian, and mustard, internally, and stimulating ointments externally. The third is a case of a maniac, who fasted fourteen days without appearing to be much weakened by it.

8. *History of a Case of Angina polyposa, or Croup, which terminated successfully under the Use of Calomel and Emetics.* Communicated to Dr. Duncan by Dr. Albers, Physician, Bremen.

The patient was a child of five years of age; the symptoms were severe: leeches were applied to the throat, calomel given in the quantity of one grain with sugar every two hours, and a large blister applied below the place from which the blood was drawn by the leeches. The respiration was relieved by these means, and some expectoration of "viscid skin-like matter" came on, which was assisted by occasional emetics. The calomel was continued till the child had taken twenty-four grains, and its gums were sore. The symptoms, from the first attendance of Dr. Albers, seemed to have abated, and in a few days were altogether removed. It does not seem to us proper to place the credit of the cure altogether to calomel and emetics, when bleeding and blisters were early employed.

9. *Remarks on a Case of Inversio Uteri terminating fatally.* By the same.

The patient, about a quarter of an hour after delivery, became

came pale, and the uterus was found inverted, with the placenta attached to it. The placenta was removed, but the patient died soon after of a fit, without the author being able to assign any adequate cause for it.

10. *Cases of Yaws and Leprosy, treated with nitrous Acid and oxygenated Muriat of Potash.* By C. Chisholm, M.D. Inspector-general of the Ordnance medical Department in the West Indies.

This consisted of large ringworms, and four "yawy excrescences," got by sleeping with an infected person. In less than three months the patient was cured by nitrous acid, given to the quantity of two drachms in the day in a quart of water, and increased to three drachms. The success of this remedy is also confirmed by the experience of Dr. Davidson of Martinique.

One of the cases of leprosy was cured by oxygenated muriat of potash, in the dose of half a drachm in the day, in six weeks, and the two others by the nitrous acid.

11. *A curious Case of spasmodic Affection of the Face, cured by the oxygenated Muriat of Potash.* By the same.

This is a case of violent spasms in the face, occurring after a long-continued nervous headach, and readily excited by speaking or eating. They were cured by half a drachm of oxygenated muriat of potash given every day for three weeks; and this medicine had the same good effect on a relapse. It seemed rather to increase the symptoms at first.

12. *A short Account of the epidemic Polypus at Grenada in* 1790. By the same.

This disease occurred among some negroes whose food was chiefly vegetable, and "who were at once exposed to excessive heat, a cold chilling current of air, and the miasma of a marsh." "Its commencement was marked by no distinguishing symptom; but soon after, the patient complained of pain at the pit of the stomach and head, and difficult respiration. These pains were attended with a dry skin, small quick pulse, and slight, dry, frequent cough. No febrile heat accompanied these symptoms; on the contrary, the surface was at this period remarkably cool; but a heaviness and dulness of eye, a melancholy, or depression of spirits, and features strongly expressive of anxiety, were constant attendants. The state of the patient was thus characterized for three days. At the expiration of that period, the pulse became extremely quick, from 120 to 140, and intermitted, attended with a penetrating pungent heat, which produced a pricking sensation on the hand of the person

feeling the pulse. But this state of the pulse and heat, as well as the pains, anxiety, and other distressing symptoms, now also intermitted, or rather the disease assumed something like an intermittent form; the intermission, if it may be so called, continuing eight or nine hours. During the paroxysm, the struggle for breath, the aggravation of all the other symptoms, and the very quick, interrupted, and evidently visible, as well as audible, palpitation of the heart, produced a scene of uncommon horror. The paroxysm was succeeded by a cold clammy sweat, and a state of approaching syncope. The second paroxysm generally put a period to the existence of the patient. The disease was also distinguished, during this latter stage, and even for some time previous to its commencement, by a constant, or almost constant, disagreeable clammy sweat overspreading the face, the upper extremities, and the body as low down as the scrobieulus cordis, all below remaining arid and parched in a most remarkable degree. The disease "seemed sometimes inclined to terminate by metastasis."

On dissection, the author found polypous substances in the pulmonary arteries, and in the auricles and ventricles; and hence he calls the disease "Epidemic Polypus." He considers it as consisting in a "laxity of fibre, a want of due cohesion in the mass of blood, and a consequent deposition and accumulation of coagulable lymph in the cavities of the heart, where the various valves and columni favour such accumulation, produced polypi, an interruption, and at length a total stop, to the circulation." Having this view of the disease, it was manifest, he adds, "that such means as might prevent deposition and accumulation of coagulable lymph, or destroy it, should it have happened, in the first instance, and afterwards restore tone to the fibre, would cure the disease."

His treatment we shall give in his own words: "The moment I could distinguish the disease, I bled, in order to render circulation through the lungs and heart, less difficult and obstructed. This evacuation was never repeated without great caution, and the most evident necessity. After this, I gave calomel in doses of five grains, guarded with opium, every fourth hour, and continued it till salivation was excited. Under this treatment I lost not a single patient; the fatal terminations having taken place before I could carry it fully into execution."

The author's theory of this complaint seems to us to be extremely hypothetical, and rests upon a circumstance which is by no means proved, viz. that polypi, found in the heart, and

large

large vessels, after death, are formed previous to disease. Neither does the cause he assigns seem to us to be sufficient to produce the effect; for many diseases must immediately occur to our readers, in which there is laxity of fibre, and want of cohesion in the mass of blood to a considerable degree, in which such a complaint never occurred. On the formation of polypi in the heart and large vessels, we would refer our readers to Dr. Baillie's observations on the subject, at page 21 of his "Morbid Anatomy."

We have now finished our account of the original medical communications of this volume; and we cannot forbear remarking, that there is much less important and interesting matter in this part of the volume, than we have before had occasion to observe.

The last section of the "Annals of Medicine" is occupied with medical news. In this there are accounts of establishments for cow-pox inoculation in London, Edinburgh, York, and various other parts of the kingdom, as well as in Ireland, France, and America.

Dr. Duncan is inclined to conclude, from several letters which he gives, and many inquiries he has made, that the cow-pox has never occurred among cows in Scotland. A letter from Dr. Barry of Cork, to Dr. Pearson of London, seems to shew, that the cow-pox has been long known in Ireland by the name of *shinach*, and that the common people are not unacquainted with its effects in preventing the small-pox.

Mr. Wise (of Maryport) mentions, in a letter to Dr. Duncan, his being successful in the cure of ringworm, and other cutaneous affections, by the use of ol. tritici, prepared "by gently pressing a quantity of wheat between two heated plates of iron, which produces the exudation of an oily empyreumatic fluid."

The volume concludes by announcing new works, giving a list of new books, and enumerating the graduates of the university of Edinburgh, the members admitted into the Royal Society, and into the Royal College of Physicians.

FOREIGN LITERATURE.

ART. VI. *An introductory Lecture on medical Education; delivered at the Commencement of the annual Course of Lectures on Botany and the Materia Medica.* By DAVID HOSACK, M.D. Professor of Botany and the Materia Medica in Columbia College. Octavo. 48 pages. T. and J. SWORDS, New York. 1801.

IN this Lecture the author, instead of seeking a new route, pursues the old and beaten path of exhibiting the several branches of medical science as they have been long taught in our schools of physic. He tells us, that anatomy, or the structure of the human body, as unfolded by dissection, is the foundation of all true knowledge in medicine, and is indispensably necessary both to the physician and the surgeon. In a particular manner, he urges the attention of the young anatomist, to the contents of the three great cavities of the body, to the blood-vessels, and to the nerves. He then passes on to physiology, which is defined to be "that branch of medical science which teaches the operation or office of the several component parts of the body, and their relative importance in the preservation of life and health." Under this head, are especially recommended to notice, the functions of the brain and nervous system, the digestion of food, the process of absorption, the circulation of the blood, respiration, and the secretions and excretions. Next in order is chemistry: followed by the theory and practice of physic, surgery, midwifery, and the materia medica, including botany and pharmacy; of all which, in succession, he gives a brief and general account. And to each head is added a catalogue of books which are supposed to be most deserving of being studied.

This plan of writing appears to be extremely liable to become uninteresting and uninstructive. It scarcely embraces the alphabet of medical science. By attempting to traverse too vast a field, the Professor is precluded from giving adequate attention to the importance of any single part. Hence his remarks are necessarily insulated and desultory; they merely convey partial and superficial information; and they lose all the advantage of connexion and consistency.

We would not be understood to insist, that such performances as this, ought always to contain something new. In the business of education, it is not reasonable generally to require originality of matter, or novelty of invention. Without being

designed to add to the substance or richness of science, a publication may possess extensive merit: it may collect scattered portions of knowledge into a single mass, condense and refine it, and confer form, arrangement, simplicity, and unity. But in all these respects our Professor seems to have declined any efforts towards improvement, and rigidly to have conformed himself to the examples of preceding writers.

As this pamphlet purports to be a lecture which was actually delivered in Columbia College, we find it difficult to understand in what manner the Professor, while occupying the entire circle of medical science, found means to avoid the embarrassment of interference with his colleagues. He not only treats, in general terms, of the branches assigned to his brethren, but specifically selects and recommends the books which he judges to be chiefly worthy of being studied in each department. In medical schools, it has been usually deemed indelicate and disrespectful for one Professor unnecessarily to encroach on the province of another. But this is a question rather of collegiate than of critical jurisdiction.

The list of authors, which is subjoined to the observations on each division of medical science, would have more forcibly arrested our attention, if the Professor had chosen to accompany it with any brief characteristic remarks, or any notices of their peculiar merits or defects. A naked catalogue of books can be furnished, at any moment, by an intelligent bookseller. But, by two or three strokes of the pencil, to pourtray a likeness, such as all the world would instantly recognise, requires the hand of a master. Let us illustrate our meaning more precisely by an example:—In the department of physiology, and especially under the head of respiration, the works of Baron Haller are recommended by our author, without the least qualification. Now, it is universally known, that, since the time of Haller, physiology has undergone almost a complete revolution; and that, particularly with respect to the function of respiration, which he concluded to be principally subservient to the formation of the voice, the discoveries of the moderns have been brilliant and interesting. To recommend Haller on that subject, without such a caution, is surely little better than to mislead the student.

We perfectly agree with the Professor in his opinion concerning the importance of natural philosophy (or mechanical, as we would rather call it, in contradistinction to chemical philosophy) in a course of medical studies. He adopts a good rule in advising any student, under his direction, "who has

 not

not had the advantage of classical education, to attend one or more courses of lectures on natural philosophy, as taught in Columbia College."

In treating of the function of respiration, our knowledge of which has been so much improved in modern times, the Professor refers to several writers who have thrown much light on this subject. But we are surprised to find him directing the attention of students to the "elementary writings" of Lavoisier, Fourcroy, Chaptal, and Priestley, as "amply" (for such is the expression) treating of this function. It is universally known to chemists and physiologists, that the three latter writers do not discuss this subject to an extent which can be called "ample;" and as to Lavoisier, the Professor surely forgets that he barely mentions respiration, in his "Elements of Chemistry," in the most transient terms.

The remarks of our Professor on the instability of theories of medicine, as well as of many other sciences, we fear, are but too well founded. We have witnessed a long succession of them, almost as numerous as the annual shooting of leaves in spring, and their fall in autumn. But in one of his illustrations of this subject we must be permitted to dissent from him. He tells us that "even the system of gravitation, which was supposed to be established upon a basis firm as the earth itself, at this time has its opponents." We think he would have been rather nearer to historical and scientific correctness, if he had inverted the order of the sentence, and said "that the system of gravitation, which formerly had its opponents, at this time is established upon a basis firm as the earth itself." We have not lately heard of a single eminent mathematician and astronomer who appears as an opponent.

In more than one passage of this lecture, our Professor gives us to understand that he is no friend of the doctrines of Brown, Girtanner, and Darwin. Though we, too, have our objections to these celebrated theorists, we must confess that our edification would have been much greater if he had taken the trouble, even in a few words, to state the grounds of his dissent. The most explicit account of his objections is given by observing that "the excitement of Brown, the irritability of Girtanner, and the absorbent system of Darwin, may possibly, in a short time, be consigned to oblivion." But as no person doubts the existence of irritability and excitement, and an absorbent system of vessels in the animal body, we are driven to conjecture that the Professor means, that certain excesses and abuses in the employment of exciting powers, by Brown; the

the hypothesis of Girtanner, that oxygen is the principle of irritability in animals; and Darwin's doctrine of the retrograde action of the absorbents, "may possibly, in a short time, be consigned to oblivion." And this we shall not, at present, undertake to deny.

We are sincerely concerned to find one of our countrymen speaking, as the Professor permits himself to do, of three British writers, now living, who are distinguished for their philanthropy, enterprise, and devotedness to science, viz. Beddoes, Thornton, and Townshend. In referring to their opinions, he calls them "revived Paracelsic notions." The name of Paracelsus is associated with every thing detestable and vile. What resemblance our Professor has been able to trace between the jargon of this man and the writings of those respectable philosophers, we are unable to perceive. If conjecture might be indulged, we should say he refers to certain speculations concerning chemical physiology and pathology, to be found in their books. Every thing on that subject, at present, undoubtedly is immature and uncertain. Yet this, probably, is the field in which medicine is destined to gain some of its last and highest honours.

As a specimen of the Professor's style, and skill in composition, we quote the following remarks on botany, which we willingly select, as here he may be supposed to be more completely at home.

"To those who wish to acquire a knowledge of the profession of physic, as a branch of philosophy, as well as the doses of medicines, or the formula of prescriptions, the study of the vegetable kingdom must prove a source of much useful information. The anatomical structure of plants, the nature of the relation they bear to animals, in their origin, life, growth, manner of receiving nourishment; their different kinds of food, propagation of their species, diseases, natural decomposition; their elementary principles, as afforded by a chemical analysis, and the different changes they produce upon our atmosphere, are certainly subjects of great value and importance to the physician, as well as to the philosopher. As they are subjects calculated to illustrate the general principles of physiology, and as connected with health and the cure of diseases, they cannot be thrown aside as mere matters of speculative inquiry. Considered in this view, as they have been by a Hales, an Ingenhouz, and a Priestley, we cannot pass them by as objects either useless or indifferent. If, then, the structure and physiology

siology of vegetables be of importance to a physician, in enabling him to become better acquainted with the structure and physiology of the human body, a knowledge of which is the only true guide of his practice in alleviating and curing its diseases, and which forms a line of distinction between the enlightened physician and the empiric, it is certainly of no less importance, that he should have a knowledge of those plants which are employed in the practice of physic, more especially if it be his lot to reside in the country, where many of them are the spontaneous produce of his own neighbourhood. But it is more especially necessary for him to become familiarly acquainted with those plants that are of a poisonous nature, which, though comparatively few in number, are scattered wild over our fields and pastures, and oftentimes mix with the culinary produce of our gardens.—How degrading, then, must it be to the physician not to know his food from his poison, and can [to] mistake a hemlock for a parsley, or the leaves of foxglove for those of mullein!"

As a specimen of medical literature, we cannot highly commend this performance. The blemishes we have noticed, and others which might have been noticed, seem to arise partly from the plan, and partly from the execution.

[*American Review and Literary Journ.*

ART. VII. *Archives de l'Art des Accouchemens, considéré sous ses Rapports anatomique, physiologique, et pathologique.* Recueillies dans la Litterature étrangére par JAQUES FREDERIC SCHWEIGHŒUSER, &c. i. e. *Annals of the Art of Midwifery considered in its various Relations to Anatomy, Physiology, and Pathology.* Collected from foreign Literature by J. F. SCHWEIGHŒUSER, M. D. A periodical Work, published in Parts. Part I. Octavo. 187 pages. Strasbourg printed. 1801. (Four Parts to be published yearly, price, for the year, 12 francs; for a single Part, 4 francs.)

IT is only during the last century that the art of midwifery, though highly important in itself, has been raised to the rank of a science. Being now cultivated with care by enlightened physicians, and encouraged by those governments who attend to the health and public prosperity of their subjects, this branch of the medical science has obtained a chair in most of the universities of Europe.

Though

Though many valuable discoveries have been made in this art, France has to regret, amongst other instances of the extreme neglect into which medical police has fallen, a remarkable want of proper regulations in the practice of midwifery.

The most enlightened accoucheurs of Germany have long directed their united attention both to the advancement of the art of midwifery, and to a severe vigilance over the conduct and ability of those who exercise the profession. The success which has crowned their endeavours has been particularly promoted by the publication of periodical works, in which all new ideas are submitted to critical investigation, all new discoveries and real improvements are circulated in the most rapid manner, and the errors of former practice are exposed to public censure.

Deriving information from these sources, and pursuing these designs, Dr. Schweighœuser, who is favourably known to the public by his lectures on midwifery, his long and extensive practice in it at Strasbourg, and by a valuable work on the subject which he has lately published, has proposed to trace, in the periodical work, of which the first number is now before the world, the history and progress of the art, and the discoveries and improvements which are to be found in the works of foreign practitioners.

The annals of midwifery will be composed of the following materials:

1. Treatises, essays, and memoirs relating to midwifery, translated from foreign languages, and extracts from new books or periodical publications.

2. Detached and selected notices concerning this art, and the diseases of women and children.

3. A detailed account of the best foreign works on this subject which have appeared towards the end of the eighteenth century.

4. A catalogue and analysis of the publications in every form which will appear on this subject, from the beginning of the nineteenth century.

5. Notices of any new fact or mechanical invention applicable to the art of midwifery.

6. Various other notices, such as, a biographical account of celebrated practitioners deceased; the reception met with by French works in foreign countries, and the like.

7. All interesting communications, with which the French practitioners may please to favour the editor.

As an introduction to this first number, Mr. S. gives a general view of the progress made in this art during the late century.

The other articles contained in this number are:

I. A translation of the *Description of the intermittent puerperal Fever observed in* 1781. By M. Osiander, Professor of Midwifery at Göttingen.

II. An extract from the *Reflections on the Causes of the continued puerperal Fever observed in* 1781 *at the lying-in Hospital at Cassel.* By the same Professor.

III. A translation of the *Reflections on the Metastases of the Milk, and on the puerperal Fever.* By M. Hufeland, Professor of Medicine at Jena.

IV. An extract from the *Remarks and Opinions of* M. Metzler, Physician to the Prince of Hohensollern, *on the puerperal Fever.*

V. An extract from the *Observations on the puerperal Fever, made at the lying-in Hospital at Vienna in* 1795, and communicated to the Society for improving the Art of Midwifery at Göttingen by M. Jæger, Physician to the Duke of Wirtemburg; with Remarks by Professor Osiander.

VI. An analysis of the *Critical Examination of the principal Hypotheses concerning the Nature, Causes, and Treatment of puerperal Fever, with a new nosological Table of its different Species.* By Dr. Sachleben.

VII. *Observations of the Editor on puerperal Fever.*

VIII. A translation of the *New Theory of the Metastases of morbific Matter, especially with a View to the Metastases of the Milk.* By M. Reil, Professor of Medicine at Halle.

IX. *A View of the Experiments made on the vaccine Inoculation at Hanover, Vienna, and Berlin; with the Remarks of M. Hufeland.*

X. A critical analysis of the opinion of M. Schreger *on the Uses of the Placenta.* By Citizen Lobstein, Professor in the School of Medicine at Strasbourg.

XI. Varieties; containing the account of several curious cases in midwifery.

XII. A catalogue of new publications relative to the art of midwifery.

ART.

ART. VIII. *Sur la Vaccine:* i. e. *On the Inoculation of the Cow-pock.* By Dr. CARENO. Vienna. 1801.

THE author of this treatise has already distinguished himself, by a Latin translation of the two first Parts of Dr. Jenner's Inquiry into the Variolæ Vaccinæ. The present publication is a compendium of what Dr. Careno has observed himself, or gleaned from other publications.

It is put into the form of a dialogue, which is convenient for a popular work. We are first presented, in the preface, with a concise account of the discovery of vaccine inoculation by Dr. Jenner. We are then told, that an establishment is formed in London for this practice, where Drs. Woodville, Pearson, and Simmons, inoculate persons out of number for the cow-pock; and that Government have given orders, that soldiers, their wives and children, should be inoculated at this institution.

Dr. Careno has, we believe, been misinformed on this subject. Dr. Woodville inoculates for the vaccine disease at the Small-pox Hospital; and Dr. Pearson, with his colleagues, inoculates at the Vaccine-pock Institution; but no orders, we apprehend, have been issued by Government, for inoculating the military at any public institution whatever. When, therefore, the author asserts, that the number inoculated at any particular institution is incalculable, he anticipates what we shall be happy to see realized.

Dr. Careno gives a most satisfactory account of the rapid progress which the Jennerian practice is now making in every part of Europe, and the civilized world; a progress, to which his own enlightened publication cannot but give an additional impulse.

In pursuing the subject, he points out the disastrous consequences of the small-pox; then the insufficiency of variolous inoculation, and its dubious advantage; and lastly, the new practice proposed by Dr. Jenner; a practice, which is attended with such wonderful effects, that it seems to strike the world with astonishment, and almost to surpass human belief. This, indeed, has been one impediment to its progress.

We are happy to observe the general attention which this important subject seems at length to have excited; and embrace this opportunity of congratulating Dr. Jenner on the success of his labours.

ART. IX. *Pharmacologia universa, quam in Usus Auditorum suorum concinnaverat*: i. e. *An universal Pharmacologia, composed for the Use of his Pupils.* By T. J. VOLTELYN. Tom. I. & II. Large octavo. Lugd. Batav. 1797 and 1800.

PROFESSOR Voltelin had composed this work for the use of those who frequented his lectures in pharmacy in the university of Leyden. After his death, the printing was retarded by different circumstances, so that the second volume did not appear until 1800. The whole work will form three volumes, of which the last is now in the press. The author divides his book into seven parts, of which the first treats of vegetables; the second, of fossils; the third, of animals; the fourth, fifth, and sixth, of water, air, and fire; and the seventh, of mechanical remedies. [*Journ. de la Lit. Etrang.*

ART. X. *Pharmacopœia Borussea.* Editio secunda et emendata. i. e. *The Prussian Pharmacopœia.* Second edition improved. Quarto. 28 sheets. Frankfort.

THE first edition of this work appeared in 1725, under the auspices of the College of Physicians and Health, of Berlin. In the successive editions, a number, both of simples and compounds, which had appeared in the first edition, but which, from the improved state of medical knowledge, have been found of little effect, and even useless, have been omitted; and new remedies, approved by chemical and pharmaceutical experiments, have been inserted in their stead; always adding the shortest and most approved method of preparing them.

The work is preceded by a materia medica, to inform the pupils of such simples as are brought from distant parts; they have even adopted the new names, to render them more familiar. To avoid any mistake, the old name is also preserved.

As to compound medicines, in which there is opium, the dose is prescribed with the most scrupulous exactness, to prevent any unfortunate mistake.

The book concludes with a selection of remedies for the use of apothecaries in the small towns in the country, who have not always a ready method of procuring certain remedies which are only to be had in great cities. [*Journ. de la Lit. Etrang.*

MEDICAL

MEDICAL INTELLIGENCE.

Art. 11. *An Acid on carious Teeth.*

MR. Blanchet, of Quebec, has discovered, that an acid is formed near and round carious teeth. Being anxious for the preservation of several of his teeth, which were wasting and crumbling away in the common manner, he undertook to find out, experimentally, the nature of the agent which thus preyed upon them. In the course of these trials, he became satisfied, repeatedly, that if he omitted for several days to clean his teeth, the fluid collected within their cavities, would turn the tincture of turnsole to a red colour: and, when carefully applied to the tongue, would excite a considerably sour taste. The saliva alone produces neither of these effects: nor is the tincture of turnsole reddened but in the faintest degree by the fluid, if the teeth have been frequently washed. The acidity is inherent in the fluid only which is contiguous to the carious surface: it is not presumed that it is the carbonic acid, for this would fly off in gas, in so warm a temperature as that of the human mouth. It was not derived from cider, porter, or acid drink, none having been taken. Mr. Blanchet thinks it is probably the septic, [nitric] or phosphoric acid, or a mixture of both.

[*American Review and Lit. Journal.*

Art. 12. *On the Application of Snails to Ulcers.*

Dr. Ritter, of Wisbaden, recommends the application of living snails on obstinate exulcerated buboes, as a sure remedy to heal them. In one case he was obliged to take them off, as the patient could not bear the disagreeable sensation occasioned by the motion of the animal; and for the sake of experiment, he applied the juice of the snails, squeezed in a mortar and expressed. He found that it answered the purpose quite as well, as if the living animal had been used. This remedy has been likewise highly praised in scrofulous ulcers, which resisted every other mode of treatment. By what principle they produce these effects, has not yet been determined by Dr. Ritter.

Art. 13. *Remedy for the Tooth-ach.*

Dr. Handel, of Menz, recommends the following remedy as a very powerful sedative in tooth-ach, occasioned by corrupted or hollow teeth; upon the applicaion of which the

excruciating

excruciating pains almost instantly cease: ℞ Olei hyosciam. ʒj, Opii thebaici ʒß, Extract. belladon. camphoræ, āā gr vj, Olei cajeput. tincturæ cantharidum, āā gr viij. Redigantur in formam opiat.

Art. 14. *Remarks on the Cause of Rickets.*

Dr. Bobba, of Italy, has presented to the Medical Society at Paris, some ingenious remarks on the cause of rickets. It is known, that the bones owe their solidity to the phosphat of lime, and that, consequently, the cause of rickets has been ascribed to a want of that substance. However plausible this theory may be, there are cases recorded by Morgagni, Portal, and Pinel, where a mollification of the bones was observed to be complicated with the gout. Such a complication seems at first sight to be impossible, as one disease originates in a want, and the other in a superabundance of the phosphat of lime. This contradiction, however, is but apparent; for, when the bones begin to mollify, we are not always entitled to conclude, that the phosphat of lime is entirely wanting in the system; but it is sometimes probable, that on account of an inactivity in the vessels which carry this substance to the bones, it is directed to other parts, producing arthritic concretions, preternatural ossifications, &c. Frequently it is deposited in the urinary system, partly from being absolutely superabundant, partly because any morbific cause prevents its being carried to the bones; and it is remarkable, that in almost all the diseases of the bones the urine deposits a calcareous sediment. There are, besides, some rare cases, where this calcareous matter has deviated to the genitals and urethra, and gives rise, most probably, to that species of blenorrhagy, called by Swediaur arthritic. By a derivation, therefore, of the phosphat of lime from the bones to the joints, symptoms of gout are produced, at the same time a mollification of the bones, which complication is named *arthritis rachitica.* Dr. Bobba terminates his paper with observing, that a bad quality of the milk with which children are nourished, is likely to be a frequent remote cause of the rickets, and that a tonic treatment of this disease would probably answer better than the alkaline treatment, which has been recommended by some practitioners.

Art. 15. *On the Quantity of Carbon in the Blood.*

Professor Abildgaard, at Copenhagen, relates, in a letter to Citizen Huzard, the results of his experiments for the purpose

pose of ascertaining the quantity of carbon that is contained in the blood; according to which, he has found it to exist in a greater proportion in the arterial than in the venous blood. —1. One hundred parts of the venous blood of a horse have afforded, when dried at a moderate heat, 26 parts of a dry substance that could be pulverized.—2. One hundred parts of arterial blood of the same horse, gave 25 parts of a dry substance.—3. For alkalizing after Kirwan's method, one ounce of nitre by detonation, 192 grains of venous blood were required, and only 160 grains of arterial blood.—4. One ounce of venous blood gave, after being dried and decomposed in a close vessel, 115½ grains of coal.—5. The same quantity of arterial blood gave only 87½ grains of coal.—6. For decomposing 480 grains of nitre, 145 grains of coal of the venous blood were required; whereas, for this purpose only, 119 grains of coal of arterial blood were employed. This experiment, however, is not very exact, as a part of the coal being extremely light, flies away like dust. The coal of arterial blood is lighter than that of venous.—7. The red part of the blood, separated from the serum and the fibrous part, as exactly as this is possible in the common way, was, after having become dry, tried with nitre, and 130 grains of this red part were requisite for alkalizing the nitre.—8. Of the fibrous part, well separated from the serum, 202 grains have been required for alkalizing the nitre by detonation. This part of the blood, however, detonates with greater vivacity than the rest.

Art. 16. *Establishment for the Preparation of artificial mineral Waters at Paris.*

There exists at present in Paris, an establishment for the preparation of mineral waters, which is certainly unique in its kind. It has been instituted by Citizen Paul and Co. and was inspected by a committee from the Society of Medicine of Paris. Artificial mineral waters of all kinds are prepared, and that to any strength which may be thought proper. In preparing the waters, the analyses of Bergman, and those who adopted his method, are followed. The use and analysis of those waters, which are imitated from nature, are well known; but it may not be improper to say something of the medical properties of such as are only prepared by art, viz. the *alkaline gasous*, the *hydrogenated*, the *hydrosulphurated*, and the *oxygenated*. The *alkaline gasous water* contains in 20 ounces, of carbonic acid six times its volume, of carbonat of potash 144 grains. It has been

been much recommended in the calculus, and gravel of the bladder; and though it is not able to dissolve the calculus, as has been by some asserted, yet it greatly diminishes the pains that attend those complaints. Three or four glasses of it, with a little milk, ought to be drank every morning within the space of six hours. It is likewise of use in other affections of the bladder. The *hydrogenated water* contains in 20 ounces, one third its volume of hydrogen gas; it acts as an antispasmodic and soporific. The *strong hydrosulphurated water* contains in 20 ounces, of hydrogen gas half its volume, of hydrogen sulphurated gas, one fourth its volume. This water has a great similarity with the sulphurated waters of hot wells, by its hepatic smell and taste. It is diaphoretic and resolvent, and may be employed in obstructions of the viscera, tumours, &c.

Professor Odier, at Geneva, relates several cases that were cured by this water, and among others, that of a woman who had for two years a painful tumour or schirrus in the breast, which the surgeons intended to extirpate, and at the same time an enormous wen, (goitre,) for the last of which she began to take the hydrosulphurated water; and having continued it for above two months, she was cured at the same time of her wen and the tumour in the breast. The strong hydrosulphurated waters employed in baths and lotions, are extremely serviceable in all psoric diseases, and inveterate ulcers.

Oxygenated water contains in 20 ounces, of oxygen gas half its volume. The art of preparing this water is entirely owing to Citizen Paul, a discovery which is very important, and may prove useful both to arts and medicine. The oxygen gas is not very intimately combined with the water, but easily disengaged from it; however, a sufficient quantity is retained in it, to produce sensible effects upon the animal economy, particularly if proper care be taken to prevent its evaporation. It increases and forces the appetite, and it has been found of great benefit in spasms of the stomach, humid asthma, dropsy, periodic and nervous affections, which even resisted the bark and the most efficacious antispasmodics, in lingering convalescences, and, in short, in all cases where it is required to increase the tone of the organs, and to stimulate the circulation. It is given by glasses every two hours. Sometimes it produces dysuries, on which account we should begin with small quantities.

THE

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Art. I. *Philosophical Transactions of the Royal Society of London, for the Year* 1801. *Part I.* Quarto. 240 pages. Elmsly, London. 1801.

THE greater number of the articles contained in the present volume are on subjects of medical philosophy; such we shall therefore lay before our readers, omitting those which have no relation to the peculiar province of our Review.

The first paper is *On the Irritability of the Nerves*, by Everard Home, Esq. F.R.S. which was read as the Croonian lecture on the 20th of November 1800.

The nerves have been considered by most anatomists and physiologists as chords that have no powers of contraction within themselves; but only serving as a medium, by means of which the influence of the brain may be conveyed to the muscles, and the impressions made upon different parts of the body, conveyed to the brain. Our author was induced, however, from the experiments and observations contained in this paper, to adopt a different opinion; and his attention was first directed to the subject by the following curious case, in which some of the nerves seem to have been the chief seat of the disease, and to have possessed no small degree of irritability. A person having hurt his thumb by falling with his whole weight on it, the part swelled and became very painful; in a few months it got well, but the motions of the thumb were not always under the command of the will. About three years afterwards, on exposing the hand to cold, the thumb was

was bent in towards the palm of the hand, a spasm came upon the muscles of the arm, making them bend the elbow; and immediately he became insensible. The patient, after this, experienced several similar spasmodic attacks, attended with, or succeeded by a state of insensibility. As the motion of the thumb was the first symptom in all these attacks, the assistants contrived a glove, the front of which was strong enough to resist the motion of the thumb, and to keep it in its place; and while this was kept on, the attacks were less frequent. A ligature was then applied round the fore-arm; when the thumb began to be agitated, this was tightened, and the spasms were found to be arrested at the ligature, and deprived of their violence.

From this time a tourniquet was kept constantly upon the fore-arm, and a person was always in readiness to tighten it, the moment the spasm was expected, which was always preceded by a general sense of uneasiness all over the body; as soon as the spasm went off, which it did instantaneously, the tourniquet was loosened. The spasms in the thumb and fore-arm returned frequently, and at regular intervals, generally every three hours; sometimes oftener.

In this state Mr. Home first saw the patient, and after watching the symptoms for three days, made the following observations:

"That the beginning of the attack was some involuntary motion of the thumb and fore-finger; and therefore, the disease appeared to be in the branch of the nerve which supplies these two parts, called by Winslow, the median nerve.

"That the progress of the spasms was in the direct course of the trunks of the median nerve, up to the head.

"That compressing the parts in the course of that nerve, when it was done before the spasms had reached them, always arrested their progress; but, when once the muscles had become convulsed, or agitated, the same compression had no effect in stopping the progress of the spasms.

"The mode in which the spasms were propagated along the course of the nerves, was as follows.

"Five or six tremors took place in the flexors of the thumb and fore-finger; then similar convulsive motions affected the muscles of the fore-arm; soon after, the muscles of the arm were thrown into the same kind of action; afterwards the pectoral muscle, and scaleni of the neck: the muscles of the lower jaw were probably in the same state, although their action was not within the notice of the by-standers. The head

head was pulled forcibly to that side, in quick successive motions, and in a second or two, the whole ceased; the parts became tranquil, the insensibility went off, and the patient recovered himself: there was, however, a general feel of languor and distress over the whole body, before the recovery."

The disease appearing, from these observations, to be decidedly in the inferior branches of the median nerve, it was proposed to divide this nerve, as it passes from under the annular ligament of the wrist towards the thumb; for this purpose, the nerve was laid bare, for above an inch in length; it was then detached from its lateral connexions, and, in this exposed state, a probe-pointed bistoury was passed behind it, and the nerve was raised upon the edge of the instrument, so as to be distinctly seen by the different medical gentlemen present, before it was cut through. As soon as it was divided, the two ends retracted from one another, to a considerable distance, a circumstance which was not expected, as the nerve was disengaged from the cellular membrane, and no other part had been divided whose action could make the portions of the nerve recede.

This operation, though certainly what any judicious physician or surgeon would have advised, did not seem to put a stop to the disease; the wound healed with difficulty, and the spasms recurred at intervals with increased violence. The last day on which Mr. H. saw the patient, was the forty-fifth after the operation, when he went into the country; and though for the first fortnight the spasms appeared to diminish, they afterwards became more violent. From this time the patient was not under Mr. Home's direction; but he understood that after trying large doses of opium, and also electricity, without any good effect, he died in a fit, about five months after the operation had been performed.

In this case Mr. Home supposes "some of the branches of the median nerve had acquired, from disease, an unnatural power of contraction, which was made evident by the operation; and there is every reason to believe, that the spasmodic attacks which took place, were in reality convulsive motions in the nerves themselves, which excited corresponding contractions in those muscles that were under their influence."

In order to ascertain whether the nerves were really irritable, and whether the retraction which happened when the operation was performed, arose from an increase of natural action in the nerve, or from a new action produced by disease, the author made a number of experiments, which do not however,

 in

in our opinion, afford any proofs of either. When the bared nerves of rabbits were cut, the two ends immediately receded from each other; the same took place when the phrenic nerve of a horse just killed, was laid bare and divided. Twelve inches of the bared phrenic nerve of a horse being measured, and taken out, was then found only $11\frac{1}{8}$ inches; so that it had contracted $\frac{7}{8}$ of an inch. The author, however, was not able to produce any contraction by mechanical irritation, or by electricity, in portions of nerve newly taken out of the body. In short, we suspect that the retraction here observed, depended on the vis elastica, and not on the irritability of the nerve. This would appear from the author's fifth experiment, in which he says, that "eighteen inches in length of the phrenic nerve were measured, and separated by means of scissars: the contraction producd was only $\frac{3}{8}$ of an inch; the experiment being made nearly an hour after the horse was knocked down. Upon being stretched with forec, it elongated to 18[illegible] inches; and, on being left to itself, retracted to $17\frac{7}{8}$. It was kept till next day, and again measured, when it was only $17\frac{5}{8}$: upon being stretched, it was elongated to $18\frac{1}{2}$; but, immediately on being left to itself, it retracteed to 18 inches."

Here the retraction was evidently owing to the elasticity of the nerve. Indeed, the appearance of the nervous fibres which the author describes in the extended and contracted state of the nerve, may well be accounted for on this supposition. When extended, these fibres were straight, but when contracted, they were all serpentine. Dr. Monro, who has noticed these different appearances, compares them to the lines in the palm of the hand, and supposes that their use is to accommodate the nerve to the different states of flexion and extension.

The second article is entitled, *The Bakerian Lecture. On the Mechanism of the Eye.* By Thomas Young, M.D. F.R.S.

In the year 1793, Dr. Young laid before the Royal Society some observations on the natural adaptation of the eye to the vision of objects at various distances. Mr. Hunter, at the time of his death, was engaged in an investigation relative to this subject; and Mr. Home, assisted by Mr. Ramsden, continued the inquiry which Mr. Hunter had begun; and the results, says Dr. Young, of his experiments, appeared very satisfactorily to confute the hypothesis of the muscularity of the crystalline lens. Our author, thinking it his duty to testify his acquiescence in Mr. Home's conclusions, signified his assent to them, in a dissertation printed at Göttingen in 1796, and in another inserted in the Philosophical Transactions for 1800.

A perusal

A perusal of Dr. Porterfield's paper on the internal motions of the eye, in the Edinburgh Medical Essays, vol. iv. has induced him to resume the subject; and he thinks he has made some observations which are conclusive in favour of his former opinion.

After premising some general observations on the eye compared with the ear, and in some degree with the other organs of sense, our author proceeds to lay down some dioptrical propositions necessary to facilitate his researches; but which do not admit of abridgment. He then describes an optometer, for determining the focal distance of any eye, and the remedy for its imperfections, which he considers an improvement of that instrument, as contrived by Dr. Porterfield, (Edinb. Med. Ess. vol. iv.) and which he states to be simple in its construction, and "equally convenient and accurate in its application." Most of his experiments are confined to his own eyes, and his calculations made accordingly.

"The faculty," he observes, "of accommodating the eye to various distances, appears to exist in very different degrees in different individuals."—"In general," he thinks, "that the faculty diminishes, in some degree, as persons advance in life; but that some also of a middle age possess it in a very small degree."

The author next gives an account of his experiments made in order to determine the curvature of the cornea, and from them he concludes, "that if the radius of the cornea were diminished but $\frac{1}{20}$th, the change would be very perceptible by some of the experiments related; and the whole alteration of the eye requires $\frac{1}{5}$th."

The experiment, however, on which he lays most stress, and regards as decisive against the opinion of any change in the curvature of the cornea, for the purpose of acccommodation, is the following, which we shall give in the author's own words: "I take out of a small botanical microscope, a double convex lens, of eight tenths radius and focal distance, fixed in a socket one fifth of an inch in depth; securing its edges with wax, I drop into it a little water, nearly cold, till it is three fourths full, and then apply it to my eye, so that the cornea enters half way into the socket, and is every where in contact with the water. My eye immediately becomes presbyopic, and the refractive power of the lens, which is reduced by the water to a focal length of about 16 tenths, is not sufficient to supply the place of the cornea, rendered inefficacious by the intervention of the water; but the addition of another lens, of

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five inches and a half focus, restores my eye to its natural state, and somewhat more. I then apply the optometer, and I find the same inequality in the horizontal and vertical refractions as without the water; and I have, in both directions, a power of accommodation equivalent to a focal length of four inches, as before."

His experiments, he is also of opinion, warrant him in rejecting the idea of a change in the length of the axis of the eye, and therefore in a combined operation of changes in the curvature of the cornea and the length of the axis.

The author next inquires into the pretensions of the crystalline lens, to the power of altering the focal length of the eye. From experiments on Mr. Ware's patients, he found, that where the crystalline lens has been extracted, the actual focal distance remained unchanged in all the trials with the optometer; and from this circumstance, as well as some other experiments, which we cannot abridge, he infers, that the necessary change of refractive power of the eye is owing to an alteration of shape in the lens.

With regard to the structure of the lens, he observes, that in man, and in the most common quadrupeds, it is nearly similar. The number of radiations is of little consequence; but he finds that in the human crystalline there are ten on each side, "not three, as he once," he candidly confesses, "from a hasty observation concluded."

He has laboured much to trace nerves into the lens, but hitherto without complete success, though he has no doubt of their existence.

He considers the bony scales of the eyes of birds, described in several papers of the Philosophical Transactions, as rather intended for the protection of that organ, than to produce any effect in its accommodation.

The author finally recapitulates the principal objects and results of his investigation, which we shall give in his own words: "First, the determination of the refractive power of a variable medium, and its application to the constitution of the crystalline lens. Secondly, the construction of an instrument for ascertaining, upon inspection, the exact focal distance of every eye, and the remedy for its imperfections. Thirdly, to shew the accurate adjustment of every part of the eye, for seeing with distinctness the greatest possible extent of objects at the same instant. Fourthly, to measure the collective dispersion of coloured rays in the eye. Fifthly, by immerging the eye in water, to de-

monstrate

monstrate that its accommodation does not depend on any change in the curvature of the cornea. Sixthly, by confining the eye at the extremities of its axis, to prove that no material alteration of its length can take place. Seventhly, to examine what inference can be drawn from the experiments hitherto made on persons deprived of the lens; to pursue the inquiry, on the principles suggested by Dr. Porterfield; and to confirm his opinion of the utter inability of such persons to change the refractive state of the organ. Eighthly, to deduce, from the aberration of the lateral rays, a decisive argument in favour of a change in the figure of the crystalline; to ascertain, from the quantity of this aberration, the form into which the lens appears to be thrown in my own eye, and the mode by which the change must be produced in that of every other person. And I flatter myself, that I shall not be deemed too precipitate, in denominating this series of experiments satisfactorily demonstrative."

In a subject so very delicate as the present, and where there are so many sources of error, it is difficult to obtain results "satisfactorily demonstrative." And though we give full credit to the author for the acuteness, ability, and mathematical knowledge displayed in his inquiry, we should have preferred the employment of a softer term for his opinion of its success.

The fourth paper is *On the Production of artificial Cold by means of Muriat of Lime.* By Mr. Richard Walker. Communicated by Henry Cavendish, Esq. F.R.S.

Mr. Walker's former papers on the production of artificial cold, inserted in some preceding volumes of the Philosophical Transactions, rank his name high among the philosophers who have made this the subject of their inquiry: the methods which he pointed out for the production of artificial cold, were by much the best and neatest that had ever been published; by means of his apparatus, and some little dexterity, a great degree of cold could be produced, and quicksilver frozen, whenever the temperature of the air did not exceed 86 degrees.

In the year 1792, Professor Lowitz, of Petersburgh, having found, by experiment, "that caustic vegetable alkali, in a solid state, produced a degree of cold far exceeding any other substance before mixed with snow, viz. 83 degrees, determined to prosecute the subject; and, upon reflection, considering that the deliquescent salts were likely to be fittest for his purpose, fixed chiefly upon the class of muriatic salts, or those which have their base neutralized by the muriatic acid. The result of his experiments was the discovery, that crystal-

lized

lized muriat of lime sunk the thermometer 82 degrees; and that the other neutral salts of this class, though much inferior to that salt, exhibited nevertheless remarkable powers of the same kind."

"Professor Lowitz, having found by experiment that, at the temperature of + 27°, four parts of muriat of lime to three of snow produced a temperature of —55°, and that an increase of the salt, even in the proportion of two to one, did not diminish the effect, determined the best and surest proportions to be, three parts of the muriat of lime to two of snow.

"But, since we shall find hereafter the temperature of + 32° to be a more convenient term of comparison, we may fairly state the fact thus; that muriat of lime three parts and snow two parts, mixed at the temperature of + 32°, will give —53°.

"The snow, to produce the greatest effect, he says, should be fresh-fallen, dry, and light or uncompressed; and the salt perfectly dry, and reduced to very fine powder.

"Professor Lowitz's method is, to add at once the salt to the snow; the latter being previously put into a convenient vessel. As the salt produces the greatest effect whilst it retains the greatest quantity of water of crystallization, he prepares it during a freezing atmosphere, pounds it, sifts it, and keeps it in close bottles, in a cold place. With a mixture of this kind, Professor Lowitz froze, in one experiment, 35 pounds of quicksilver.

"Professor Lowitz observes, that with the above precautions and management, it is impossible to fail in the design of freezing quicksilver with it.

"Professor Lowitz found likewise, that the muriat of lime, prepared as above, produced 38 degrees of cold by solution in water; that is, by adding 3 parts of this salt, in powder, to 2 parts of water, each at the temperature of + 36°½, the thermometer sunk to —1°½.

"Professor Lowitz adds, that the muriat of lime which has been used for making frigorific mixtures, may be procured again repeatedly, as fit as at first for the same purpose, by evaporation and crystallization *."

Soon after the account of Mr. Lowitz's experiments was published, (see a translation of them from Crell, by Van Mons,

* "The muriat of lime made use of by Professor Lowitz in these experiments, was obtained from the residue after the distillation of caustic ammonia."

Annales

Annales de Chimie, tom. xx. p. 297.) Mr. Pepys of London, and some of his friends, repeated the experiments, with some variation, and froze no less than 56lb. of mercury. (For an account of Mr. Pepys's experiments see Phil. Mag. vol. iii.) It was not to be expected that Mr. Walker would view these experiments with indifference; he repeated those of Mr. Lowitz with his usual accuracy, and likewise made some additional ones on the power of the muriat of lime in producing cold with ice, the results of which he describes in this paper.

In order to reduce the experiments made with the muriat of lime to a greater certainty, Mr. Walker carefully obtained the "specific gravities to which this salt should be reduced by evaporation, before it be set by to cool, in order to become solid, in either instance: thus, when the muriat of lime is to be of that strength which is to be prepared and used at the temperature of + 32°, the specific gravity of the liquor should be, at the temperature of + 80°, 1.450; and when of that strength to be kept and used at the ordinary temperature of the air at any time, the specific gravity of the liquor should be 1.490, at 80° of heat.

"The liquor, when sufficiently evaporated, should be set by to crystallize; and the crystallized mass, as soon as cold, should be reduced to very fine powder, in a glass or stone mortar. The muriat of lime, in its solid state, being a hard brittle substance, it is necessary commonly to immerse the vessel containing it, in water sufficiently warm to loosen the mass, in order to remove it out of the vessel, to pound it.

"When the muriat of lime is intended to be preserved for future use, the powder should be put directly into a bottle, and closely stopped from the air; for this salt is extremely deliquescent, and hence, a dry state of the atmosphere should be chosen for preparing it."

As we apprehend that it may be acceptable to our readers to know the general results of Mr. Walker's experiments, we shall transcribe his tables.

Class I.

Acids and salts.	Ice.	Temp. of mat. before mixing.	Temp. or cold produced.
Muriat of soda 1, - - - - - - - - - - - - - -	Snow 2,	- -	— 5°
——— ——— 2, Muriat of ammonia 1, - - - - - - -	——— 5,	- -	— 12°
——— ——— 10, ——— ——— 5, Nitrat of potash 5,	——— 24,	- -	— 18°
——— ——— 5, Nitrat of ammonia 5, - - - - - -	——— 12,	- -	— 25°

Class II.

Diluted vitriolic acid 2 *, - - - - - - - - - - -	Snow † 3,	+32°	—23°
Concentrated muriatic acid 5, - - - - - - - - - -	——— 8,	+32°	—27°
Concentrated nitrous acid 4 ‡, - - - - - - - - - -	——— 7,	+32°	—30°
Muriat of lime 5 ‖, - - - - - - - - - - - -	——— 4,	+32°	—40°
——— ——— 3 ¶, - - - - - - - - - - - -	——— 2,	+32°	—50°
Caustic vegetable alkali 4, - - - - - - - - - - -	——— 3,	+32°	—51°

* Concentrated vitriolic acid, diluted with half its weight of snow, or distilled water, and cooled.

† Snow that is fresh, dry, and uncompressed, or such as has never been subject to the effects of a temperature less than freezing; or, when such is not to be procured, ice reduced to powder, in the manner described in Phil. Trans. for 1795, p. 271, may be substituted in its stead, with equal effect.

‡ Concentrated *fuming* nitrous acid alone, or concentrated *pale* nitrous acid, diluted with one fifth its weight of snow, or distilled water, and cooled.

‖ Of the strength of 1.490, at 80° of heat.

¶ Of the strength of 1.450, at 80° of heat.

"The first class consists of mixtures of salts and ice, in which the temperature of mixing is of no consequence, the effect produced being the same at any temperature of the air: the salts should be in the state of powder. Ice pounded small may be substituted, with equal effect, for snow.

"The second class consists of such mixtures as will produce an effect *greater*, the colder the temperature is at which the materials are mixed, but in a *diminishing* ratio; ceasing entirely at that degree of cold at which the composition itself freezes *. The salts should be in the state of fine powder.

"N. B. The figures after the salts, or acids, and ice, express the proportions, *by weight*, to be used."

Mr. W. describes an apparatus for making experiments with muriat of lime and snow, which is illustrated by a plate, but which does not differ much, except in some particular circumstances of convenience, from the apparatus which he has described in the Philosophical Transactions for 1795. Though this apparatus may be convenient in summer, when the ice is to be ground to a fine powder, we know from experience, that the freezing of quicksilver in winter, by means of the muriat of lime and snow, is an extremely simple and easy operation, nothing more being necessary than to put muriat of lime at 32° into an earthen or glass vessel, and mix with it *gradually* uncompressed snow, stirring the mixture well with a solid stick of glass, keeping it of the consistence of treacle, or somewhat thicker; and when the thermometer indicates a cold of —45° degrees, or 50°, mercury will soon be frozen.

Before we conclude our account of this memoir, it may be proper to mention, that Van Mons tried the effect of the caustic soda, (which alone produces a cold of —15° with snow,) combined with muriat of lime, and found the effect increased very considerably. By this mean he reduced the thermometer "to —53°, old division," (87° Fahrenheit.) He does not, however, mention the temperature at which the materials were mixed, to produce this effect.

The fifth paper is an *Account of a monstrous Lamb.* In a Letter from Mr. Anthony Carlisle to the Right Hon. Sir Joseph Banks, Bart. K.B. P.R.S.

This animal is a male, and had apparently arrived at the full period of gestation. The deviation in structure is con-

"* The materials may be cooled, previously to mixing, when required, by a frigorific mixture taken from the table: for this purpose, either of the mixtures in Class I. are convenient; particularly the first, consisting of muriat of soda and snow."

fined to the head, in which it resembles none of the monsters usually met with. The author has preserved the skin entire, and, on the suggestion of Sir Joseph Banks, he examined the brain while in perfect preservation, which seemed likely to have afforded observations highly interesting to physiology, had the animal been yeaned alive.

The head is disproportionably small, "there being no other resemblance to the natural form than in the external ears."—"The meatus externi are wanting."—"Between the insertion of the ears an opening presents itself, lined with cuticle, and capable of receiving a bougie, of the size of the human male urethra; and this proved to be a common passage to both the œsophagus and the trachea." The head is clothed with wool, and has no appearance of mechanical injury. "No vestiges of the eyes, the nose, or the mouth, are to be seen. The cranium is perfectly formed into hard bone, nearly resembles the head of a tortoise, and is about the size of a plover's egg." The os hyoides and its process are in their natural state, but the tongue is wanting; under the skin which lies between the cartilaginous insertions of the outward ears, there is a small depression in the skull, in which are lodged three regularly formed tooth-like bones immersed in a gelatinous substance. The author supposes these portions of the ossicula auditus run together. The internal surface of the cranium is neatly lined with the dura mater; the whole cerebrum and all its nerves were deficient; but the cerebellum was disposed orderly, and sent out several nerves.

These peculiarities, our author observes, conspire with other facts in proving, "that the formation and growth of animals in the uterus are independent of any influence from those parts of their brain which properly belong to sensation."

He concludes with observing, that "the intellectual phenomena of persons who sustain known injuries of particular parts of the brain; the appearances on the dissection of idiots, with their mental peculiarities; the anatomical history of maniacs, all promise, when properly cultivated, a series of truths, which it may not be extravagant to hope will open sublime views into those recesses of our construction, which justly rank among the most curious, if not the most important objects of research."

In the sixth paper we have *An anatomical Description of a male Rhinoceros.* By Mr. H. Leigh Thomas, Surgeon. Communicated by George Fordyce, M.D. F.R.S.

Our knowledge of this animal, Mr. Thomas observes, has hitherto

hitherto been extremely limited, both with regard to its natural history, and also its internal structure. A paper by Dr. Parsons, giving a very accurate description of a young rhinoceros, was read before the Royal Society in June 1743; the Doctor, however, does not attempt to describe more of it than the external figure and coverings. In the present paper, Mr. Thomas gives a very accurate description of the internal structure.

The subject of his observations "was brought from the East Indies to England, where it was intended he should remain, until a favourable opportunity should offer of sending him to Vienna. During the passage from India, he appeared to enjoy a good state of health, which continued uninterrupted, until a few days before his death; at which time, he was attacked with difficulty of breathing, and died before he had attained his third year. In the course of this time, he had become perfectly docile and tame; but never, by actions or otherwise, expressed the smallest regard or affection for his keeper, or for any of the people who occasionally fed him; neither was he easily irritated, but preserved, on all occasions, the most perfect indifference and stupidity. He was fed chiefly upon hay and oats, also potatoes, and other fresh vegetables; his consumption of which was prodigious, exceeding that of two or three working horses. It would appear, that this animal had not arrived to near its full growth: he was scarcely so high as a two year old heifer: but the bulk of his body, by measurement, considerably exceeded the length. The horn, which is affixed to the upper lip of the adult rhinoceros, was here just beginning to sprout. The hoofs were divided into three obtuse parts: the soles of the feet were well defended by a large mass of elastic matter, covered by a strong horn-like substance."

The skin, it is well known, is extremely hard and tuberculated; though smoother, and easily cut through by a common knife, on the under parts of the body: a considerable degree of sliding motion was observable between it and the surface underneath; this arose from the great quantity of loose cellular membrane, deposited between them, for the purpose of allowing the hard skin a power of accommodating itself to the body, when in a recumbent position. Mr. Thomas could not observe any fibres corresponding to the panniculus carnosus, generally found in quadrupeds: indeed this muscle would have been useless here; for, from the structure of the skin, the animal could not be sensible to the bites of insects; nor could so weak a power

a power act upon a substance so strong and inelastic. The abdominal muscles were exceedingly strong, and well marked: the tendinous fasciæ were much thicker than Mr. Thomas had ever observed in any other animal; obviously to give a sufficient support to the great weight of the viscera. The incisor teeth were only four in number; two situated in each jaw; these are placed a considerable distance from each other: besides them, Mr. Thomas observed in the head of another rhinoceros, five years old, and where the soft parts had been removed, two smaller teeth, placed one on each side those of the lower jaw: these were not pointed. There were only eight of the molares, in each jaw: this number, of course, would be increased, as the growth of the maxillary bones advanced; their form may be considered as peculiar, and has been already noticed by Mr. Home, in the Philosophical Transactions for 1799, Tab. XXI. The inside of the mouth presented nothing unusual; the membranes covering it were not thicker than those found in other graminivorous animals. The pharynx and œsophagus were large and capacious. The stomach, with the whole of the alimentary canal, was, in external appearance, very similar to that of the horse, only that the cæcum was considerably larger; which variety accounts for the great size of the abdomen, already noticed. The stomach, upon its inside, was in every part covered by a secreting surface; whereas, in the horse it is partly cuticular. The small intestines were extremely short; but the surface upon the inside was considerably extended, by the internal coat being thrown into processes of an oblong form; these, after the mesenteric vessels were injected, put on a beautiful villous appearance: it would appear, that they answer the same purposes as the valvulæ conniventes in the human subject; they differ only in the mode of arrangement, and are unlike what Mr. Thomas ever observed in any other animal.

The liver was of a dark black colour, very soft, giving as little resistance to pressure as the human spleen generally does: it was divided into several lobes. The gall-bladder was wanting. The spleen and pancreas were very similar to those of the ox. The kidnies were large, and considerably flattened: they were lobulated, but their lobes did not appear so distinct as those of the same gland belonging to the bear; probably, as the animal advances in life, this appearance may be altogether lost, as takes place in the human body, and a variety of other animals. Upon throwing some size, coloured with vermillion, into the emulgent artery, Mr. Thomas was surprised to perceive the

the coloured matter escape by the ureter, without any considerable pressure of the piston: this circumstance induced the author to insert the pipe into the excretory duct of the other kidney; when the injection escaped, with the same ease, by both artery and vein. Mr. Thomas says, he should not have noticed these circumstances, which have occasionally occurred to him when injecting the human kidnies, and also those of other animals; but, in these instances, the great facility with which the injection passed, surprised him, and at the same time proved, in a remarkable manner, the simple structure of this gland. The organs of generation had not arrived to maturity: the testes were small, and situated without the abdomen; the vasa deferentia did not allow quicksilver to pass along them; and, upon the whole, it was evident the testes never had secreted. The vesiculæ seminales were cellular; and in shape and structure like those in the human subject: they contained only a small quantity of a ropy fluid. Upon throwing some coloured wax into the corpora cavernosa of the penis, the extremity became expanded, with the meatus urinarius placed in the centre; this expansion was not so considerable as is observed in the horse: about three inches below, a second enlargement took place, though not so complete and perfect as the first. The penis was curved in its form, with the convex side towards the body; which proves that this animal must be a retro-coient: indeed his general structure might have suggested this idea, had not these parts been particularly attended to. The contents of the thorax presented nothing worthy of remark. The lungs every where adhered to the inside of the thorax, and were in a high state of inflammation; which latter circumstance was probably the cause of the animal's death.

In examining the eye, Mr. Thomas found that the muscles of the eyeball were exactly similar to those of other graminivorous animals; the globe of the eye was not larger than that of a sheep; and the cornea was much smaller: upon endeavouring to separate the sclerotic coat from the choroid, he found an uncommon resistance at the posterior part of the eye; though, in other parts, the adhesion appeared less than what takes place in the human eye. This unusual connexion naturally directed his attention more particularly towards it, and, on farther examination, he discovered four processes, arising by distinct tendons from the internal and posterior portion of the sclerotica, and at equal distances from the optic nerve. These processes passed forwards between the coats, gradually

gradually becoming broader, and being insensibly lost in, and forming a part of the choroid, at the broadest diameter of the eye. The processes had a muscular appearance; the fibres running forward in a radiated direction; they were detached from the coats with the greatest facility, except at their origins and insertions; and, at their terminations, they became so intimately connected with the choroid, as to form only one substance. The ciliary processes were affixed to the crystalline lens, but were extremely short and indistinct; not having that beautiful arrangement commonly seen in the eye of other quadrupeds. The iris was circular, and of a brown colour. The crystalline lens was somewhat remarkable with respect to its form, being nearly spherical; the anterior surface was a little flattened.

The processes above described, appear, Mr. T. observes, as far as sight can determine, to be muscular; and what more particularly tends to confirm this notion, is the very distinct tendons connecting them with the sclerotic coat. "It is well known," says he, "that the iris, and also other parts of the body, possess to a great degree the power of contraction, without our being able to demonstrate muscular fibres; allowing, therefore, these processes to have the common properties of muscles, we shall be better enabled to form some idea of their uses."

With respect to their uses, our ingenious author remarks, that in the easy and natural state of the eye, it is probably so adjusted as to view with perspicuity very near objects, requiring some change to adapt it for distinguishing distant ones. This change, he supposes, may be effected by the four processes acting conjointly; at their terminations they completely encircle the eye at its broadest diameter; therefore, upon their contracting, the axis of vision [axis of the eye] will be shortened, and the retina brought nearer to the crystalline lens; consequently the eye will be better fitted for seeing objects at a distance. "In birds, there is placed at the posterior part of the eye, a muscular process, called by Haller, pecten avium, by others, marsupium: this answers the same purposes as these processes, the arrangement of its fibres only differing. In the chameleon, and also in many fishes, a similar structure is found, calculated to produce the same effects; and probably something of the same nature may be seen in the eyes of many other animals, which has hitherto escaped observation."

In a plate are given three different views of these processes,

cesses, and a view of a portion of the jejunum inverted, to shew the folding of its internal membrane.

The eighth article is an *Account of the Discovery of Silver in Herland Copper Mine.* By the Rev. Malachy Hitchins. Communicated by the Right Hon. Sir Joseph Banks, Bart. K.B. P. R. S.

Herland mine is situated in the parish of Gwinear, about seven miles north-east of St. Michael's Mount, on the southern coast of Cornwall; and two miles and a half from the mouth of the river Hayle, on the northern coast of the same county: it is contiguous to Prince George mine.

"Although the numerous veins of lead in Cornwall are richly impregnated with silver, and occasionally yield small quantities of silver ores, and even specimens of native silver; yet, hitherto, no instance had been known of their yielding this precious metal in such abundance; nor had any circumstances, in the natural history of the mineral veins of this country, born any analogy to those which accompanied the present discovery."

The silver ore, here found, "is a mixture of galena, native bismuth, gray cobalt ore, vitreous silver ore, and native silver; which, in respect to their proportions, follow the order in which they are here enumerated, the galena being the most prevalent. The native silver, of which specimens of the greatest beauty have been reserved for the cabinets of the curious, is found chiefly in a capillary form, in the natural cavities of the lode.

"About one hundred and eight tons of this ore have been raised. The miners continue to sink near the same point of intersection; and seem confident that both lodes will soon become richer, because similar instances of declension and recovery have frequently occurred in the copper lodes of this mine, and because the two lodes appear to have a reciprocal influence on each other.

"Unfortunately, however, the extent of their speculation is limited by the great depth of the present workings; for, forty-five fathoms have been sunk since the first discovery of the silver; and twenty, or twenty-five fathoms more, are as much as can be sunk in this mine, with its present mechanical powers of drawing the water; at which level, viz. one hundred and eighty fathoms from the surface, it would be somewhat deeper than any mine in Cornwall, and about one hundred and thirty fathoms below the level of the sea, at low water mark."

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The ninth essay contains *An Account of an Elephant's Tusk, in which the Iron Head of a Spear was found imbedded.* By Mr. Charles Combe, of Exeter College, Oxford. In a Letter to the Right Hon. Sir Joseph Banks, Bart. K.B. P.R.S.

The tusk weighed fifty pounds, and measured six feet in length; and was supposed by Mr. Pope, an eminent manufacturer at Birmingham, to have come from Africa, as he procured it at a sale in Liverpool. When it was delivered into the hands of the workmen, they perceived, on the tusk being shaken, a rattling noise, about two feet and a half from the base; and, in consequence, made a transverse section, somewhat below the part whence the sound proceeded. Here, on enlarging the aperture by a chisel, they distinguished a hard extraneous body, and, on making other sections, found it to be an iron spear-head, considerably corroded. The most probable conjecture is, that the spear head entered at the basis of the tusk, and acting by its gravity, would descend, till prevented by the resistance of the converging parietes of the cavity. After a process of time, when the tusk had been protruded farther from the skull, in consequence of growth, fresh bony matter would necessarily be deposited, to preserve a corresponding relation between the sides of the cavity and the tusk: and thus the spear-head would become gradually imbedded within the ivory.

The tenth paper contains *A Description of the Arseniates of Copper, and of Iron, from the County of Cornwall.* By the Count de Bournon. Communicated by the Right Hon. Sir Joseph Banks, Bart. K.B. P.R.S.

This paper is divided into two sections: the first of which contains an account of the arseniates of copper, the natural combination of the arsenic acid with copper; and the different aspects under which this combination appears, according to the proportions in which these two substances are united, Count de Bournon observes, were among those objects of mineralogy, respecting which our imperfect knowledge required the aid of study and observation. A new copper mine, lately worked, called Huel Gorland, in the parish of Gwennap, in the county of Cornwall, having, within the last two years, enriched the cabinets of London with some very fine specimens of these arseniates, he was induced to pay particular attention to them; and in this paper he gives a very accurate description of the different species of these ores.

"It is now above twenty years, since arseniate of copper was discovered in the county of Cornwall; it was first found

either in Carrarach mine, in the parish of Gwennap, or in Tincroft mine, in the parish of Allogan. Its matrix, like that of almost all the copper ores of this country, was siliceous, and consisted of a decomposed granite, of which the greatest part of the feldspar had passed into the state known by the name of Kaolin. It was accompanied with gray vitreous copper ore, frequently in considerable masses: also with much black oxyd of copper; and with various oxyds of iron.

"The arseniate here spoken of, which had never been found in large quantity, had ceased to exist in the above-mentioned mines, when Huel Gorland mine, lately wrought, began to enrich mineralogy with this uncommon substance. The matrix of this is likewise siliceous; sometimes crystalline; and sometimes in an amorphous mass. Here and there we find mixed with it, in greater or less profusion, all the known oxyds of copper; many of the argillaceous oxyds of iron; also gray vitreous copper ore; arsenical pyrites; and the rich deep-coloured yellow copper ore."

The existence of arseniate of copper seems, even at this day, to be an object of doubt among the French mineralogists: for "the Abbé Hauy does not mention it in the 28th and following numbers of the Journal des Mines, although they contain an interesting extract of a system of mineralogy, which he was then preparing for the press; nor has M. Fourcroy even hinted at it, in his Système des Connoissances Chimiques, lately published."

Nature appears to have "established very remarkable differences between the arseniates of copper; and these take place not only in their forms, but likewise in their hardness and specific gravity. These differences arise, either from the manner in which the arsenic acid is combined with the copper, or from the different proportions in which these two substances are combined."

The Count follows the same order, and divides the arseniates of copper into four different species; and the very interesting analysis of this substance, made by Mr. Chenevix, has, he observes, afforded the most satisfactory sanction to this division.

The first species is, arseniate of copper in the form of an obtuse octaedron—2nd, in hexaedral laminæ, with inclined sides—3d, in the form of an acute octaedron: of this species, he describes five varieties—4th, in the form of a triedral prism.

The second section contains an account of the arseniates of iron.

 "Muttrell

"Muttrell mine," our author observes, "which is immediately contiguous to Huel Gorland mine, in the county of Cornwall, has produced some specimens of arseniates of copper, exactly similar to those described in the former part of this paper. But this mine is still more interesting to mineralogists, on account of a combination found therein, of arsenic acid with iron, and also a double combination of that acid with both iron and copper.

"The first mentioned of these arseniates seems analogous to those crystals, or cubes, of a fine green colour, of which some specimens had already been found in Carrarach and Tincroft mines, and which Klaproth, in his Memoir upon the Mineralogy of Cornwall, considered as belonging to the arseniates of copper; but, according to the analysis made by Mr. Chenevix, with all the care which his extensive knowledge and extreme zeal for science would naturally lead him to employ, it appears to be a true arseniate of iron, containing only a small quantity of copper; and even that quantity seems to be merely an accidental mixture. As, in the specimens from the old mines of Tincroft and Carrarach, the greatest part of the crystals adhered to vitreous gray copper ore, it is possible that some particles of that ore remained attached to the crystals; or, as I have frequently found to be the case, that some such particles had penetrated into the crystals, and that Mr. Klaproth had been thereby deceived, by finding in the button left by the blow-pipe, a much greater proportion of copper than this ore really contains. The natural decomposition of this arseniate, which produces an oxyd of iron of a fine reddish yellow colour, strongly confirms the result of Mr. Chenevix's analysis.

"The double combination of the arsenic acid with iron and copper, although it had appeared to exist in the arseniate just spoken of, in the mines of Tincroft and Carrarach, had not excited the attention of mineralogists. It is however possible, that the transparency, the brilliancy, and the pale blue colour of its crystals, might occasion them to be mistaken for crystals of a stony nature. Besides, their smallness might easily cause them to escape the notice of common observation, particularly when they are not in pretty large groups."

The matrix of these arseniates appears, from our author's description, to be exactly the same as that of the arseniates of copper; "consisting, like that, of quartz, mixed with yellow, gray, and vitreous ores of copper, with oxyds of iron, and with

with mispickel. The mines of Huel Gorland and Muttrell, although not situated in the district of the tin mines, have yet produced some specimens of tin, the crystals of which are covered with those of the arseniate here spoken of. Two specimens of this kind are in the collection of Sir John St. Aubyn."

Of these arseniates, the Count describes two species: 1st, Simple arseniate of iron, which crystallizes in perfect cubes; 2nd, Cupreous arseniate of iron. The crystals of this species are of uncommon brilliancy, and perfectly transparent. Their form is a rhomboidal tetraedral prism, having two of its edges very obtuse, and the other two very acute.

We are sorry that our limits do not permit us to present our readers with the descriptions of this very accurate mineralogist, but must refer them to the work itself: the paper is accompanied by two plates, containing delineations of the figures of the crystals of the different species.

The eleventh paper contains the *Analysis of the Arseniates of Copper, and of Iron, described in the preceding Paper; likewise an Analysis of the red octaedral Copper Ore of Cornwall: with Remarks on some particular Modes of Analysis.* By Richard Chenevix, Esq. M. R. I. A. Communicated by the Right Hon. Sir Joseph Banks, Bart. K.B. P.R.S.

It gives us no small pleasure to see the chemist and the naturalist, who have hitherto expressed a kind of jealousy of each other, going hand in hand, and joining their efforts in the search of truth. It is only by thus freely uniting their strength, that any degree of certainty in this interesting branch of knowledge can be attained.

Mr. Chenevix observes, that "when the Count de Bournon had completed what appeared to him to be the mineralogical classification of these copper ores, he gave me some specimens of each kind, numbered indiscriminately, for the very purpose of excluding prejudice; and it was not till my task was ended, that we compared our observations. If I had been admitted into any previous knowledge of the arrangement dictated to him by the principles of crystallography, I should have been afraid, that I had merely thought true, what I wished to be so. But I can, most conscientiously, indulge in the satisfaction which the according results of different means to prove the same proposition naturally excite; and which is justly due to the truth of the outward marks, however delicate, yet still to be perceived, that nature has left visible to those who will observe her."

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We shall not attempt to follow our ingenious author through the different steps of his analysis, in each of which much chemical knowledge, and keen investigating powers of mind, are discoverable; but shall present our readers with the general results.

The first species described by the Count de Bournon in the preceding paper, according to Mr. Chenevix, contains 49 parts of oxyd of copper, 14 of arsenic acid, and 35 of water. The second species contains 58 of oxyd of copper, 21 of arsenic acid, and the same quantity of water. The third species was found to contain 60 parts of oxyd of copper, and 39.7 of arsenic acid. In the fourth were found 54 parts of oxyd of copper, 30 of arsenic acid, and 16 of water.

After having expelled the water of crystallization by exposure to a proper degree of heat in a platina crucible, the residuum was dissolved in diluted nitric acid, and nitrat of lead poured in. Arseniate of lead and nitrat of copper were thus formed, by double decomposition. To separate these two salts, alkohol was added, on which the arseniate of lead full to the bottom, while the nitrat of copper was held in solution. From the arseniate of lead procured by filtration, it was easy to calculate the quantity of arsenic acid which the ore contained; and the spirituous solution being distilled, from the nitrat of copper remaining, the quantity of that metal was obtained, by boiling the solution with potash or soda.

Mr. Chenevix next proceeds to the examination of the arseniates of iron, which were formerly included among the arseniates of copper, but which are now separated from them upon the authority of chemical analysis. Our author very properly observes, that "although to recognise, by external character and form in all their modifications, substances already known, is particularly the province of crystallography; yet he, who would expect that it should declare the nature of those substances which it beholds for the first time, would exact more than it ever has promised, or ever could perform. Among fossils, it may class, and find new species; but chymical analysis is the basis of all arrangement, among metallic ores. In them, to separate, is the task of the one; to assign a place, is the business of the other."

The cupreous arseniate of iron was found to be composed of 3 parts of silica, 33.5 of arsenic acid, 27.5 of oxyd of iron, 22.5 of oxyd of copper, and 12 of water.

The simple arseniate of iron is found to contain 4 parts of silica, 31 of arsenic acid, 45.5 of oxyd of iron, 9 of oxyd of copper,

copper, and 13.5 of water. This ore, our author observes, appears to be a pure arseniate, mixed *accidentally* with a little copper, as some of the cupreous arseniates casually give traces of iron.

The third section of this ingenious and elaborate essay, contains an *Analysis of the red octaedral Copper Ore, in which the Metal exists in a State hitherto unknown in Nature.*

In the course of the experiments which have been stated in the preceding sections, the author observes, that he had occasion to examine a great number of copper ores, particularly those from Cornwall; but the only ore which afforded any interesting results, was the well-known species called red copper ore, crystallized in regular and brilliant octraedrons. This ore has been so long known, and so often mentioned by mineralogists, that it may excite our surprise when we reflect that its chemical nature has not been accurately ascertained before; and that mineralogists differ so very much in their accounts of it.

"Romé de Lisle, the Baron de Born, Lametherie, the Abbé Hauy, and indeed every other mineralogist, concur in calling this substance red calx of copper; but some of them assert, that it contains a portion of carbonic acid. Among the many analyses which have been made of this ore, by Fontana, Monnet, de Born, Renovantz, and others, I could not find one, that in the proportions, or even in the ingredients, resembled what I had found to be its contents. The highest amount of copper, (that given by Fontana,) does not exceed 66 per cent. and is far short of the real quantity. The remainder, as he states, consists of water, and of pure and fixed airs."

The difference in the results which our author obtained, together with some new facts he had occasion to observe during his experiments, induced him, he says, to consider the subject at some length; he particularly describes his experiments, which presented a number of curious and some unexpected results, and states the component parts of this ore to be 88.5 of copper and 11.5 of oxygen; so that this ore is a suboxyd of copper; a state in which it has not before been supposed to exist in nature.

Mr. Chenevix observes, that when "we reflect, not so much on the quantity as upon the extreme purity of the copper, and the wonderful facility with which this useful metal may be extracted, it will be found much superior to every copper ore hitherto

hitherto discovered. It would be well worth the attention of miners, to keep a constant look-out for this substance, which, I am informed, is not rare in Cornwall. It contains no iron, and no sulphur; the absence of which latter is a peculiar advantage. It is a fact not generally known, I believe, that there is hardly such a thing in commerce, as copper which does not contain a little sulphur; at least I have rarely met with any such; and it requires but a very minute portion of sulphur, to increase the fusibility of copper. The advantage of obtaining copper free from sulphur, is too obvious to require to be pointed out; and that advantage does this ore possess."

Besides an account of the experiments for the purposes of analysis, this paper contains a number of ingenious observations and disquisitions, and some valuable remarks on the methods generally used in the docimastic art, which we have not room to transcribe, and they are incapable of abridgment. We shall conclude our account with a quotation, which we have little doubt will afford as great pleasure to most of our readers as it has done to us.

"But, what is not the least to be admired, is the wonderful accordance in the order which two sciences, operating with very different instruments, have allotted to the same substances. By that, not only the sagacity of Nature becomes very striking; but, from the acknowledged accuracy of one method of investigation, the reliance to be placed upon the other is rendered more conspicuous; and each receives additional strength and confirmation. Chemistry has long been in the habit of aiding the science of mineralogy, of which it laid the foundation; but it was not till lately, that crystallography could form a judgment of its own, much less confirm the truth of the source from which it sprung."

This part of the volume of the Philosophical Transactions is concluded, as usual, with the meteorological journal kept at the apartments of the Royal Society; from which we may deduce, that the quantity of rain which fell during the year 1800 was 18.925 inches. The greatest degree of heat, which happened on the 11th of August, was 89°, as shewn by Sixe's thermometer. The greatest degree of cold 18°, and the mean heat for the whole year 50.5°.

ART. II. *A Treatise on Ophthalmy; and those Diseases which are induced by Inflammations of the Eyes: with new Methods of Cure. Part I.* By EDWARD MOORE NOBLE, Surgeon. Octavo. 144 pages. ROBINSONS, London. 1800. Price 4*s.*

DISEASES of the eye are peculiarly calculated to furnish the subject of a distinct treatise, both from the high importance of the organ affected, from the disorder being in general local, and from the treatment, which frequently requires the exertion of considerable skill and judgment, being often confined to a separate branch of the profession.

The author of this treatise (of which only the first part is now published) informs us, that he has had considerable practice in this department; and that this circumstance, together with the hopes of being able to reduce to a more systematic form than has hitherto prevailed, the subject of ophthalmia in all its varieties, has induced him to lay his opinions before the public. He observes that "the art of curing diseases has, of late years, made rapid strides towards arriving at that acmé of perfection, beyond which it is not in the power of man to advance it. The light which has been let in upon us, by the doctrines of that great genius, Dr. John Brown, and so ably seconded by a Darwin and a Beddoes, has laid the foundation of a new era in the annals of medicine, and has opened new views to the practitioner, in the theory and treatment of diseases.

"Since that epoch, no regular treatise, on the inflammation of the eye, has appeared, in which the mode of treatment has been founded on systematic principles; and when we consider the importance and delicacy of that organ, we shall be surprised to find, how little has been done, towards arriving at a rational plan of cure.

"The regular routine of bleeding, blisters, and cathartics, with a variety of external applications, are generally indiscriminately applied, with little attention to the nature or the period of the disease; and there are some practitioners who act with still greater inconsistency, and maintain, that it is useless to inspect the eye; that it causes an unnecessary degree of irritation; and that we ought to trust entirely to internal medicines.

"It is my intention to endeavour to point out the propriety of a certain mode of treatment, and to discriminate the proper time for the use of different applications."

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The reader will, therefore, expect to find all the symptoms of ophthalmia, and the method of cure explained by, and referred to the systems of those able physiologists whose names the author has just cited; and he has adhered so faithfully to his plan in the treatise before us, that it might almost be entitled, An Outline of the Systems of Brown and Darwin, illustrated by the example of ophthalmia in its several branches.

We shall now proceed to a full analysis of this work, with such occasional remarks as have suggested themselves to us in the perusal.

The author defines ophthalmy to be a redness and inflammation, with pain of the tunica conjunctiva, together with pain of the eye on exposure to light. The description of an attack of ophthalmy, with the time of accession of the several symptoms, is given in the following very perspicuous and accurate manner: "On the first attack of an ophthalmy, the tunica conjunctiva becomes slightly red, with an increase of heat of the part; the eye feels dry, and, at times, as if there were small particles of dust in it; the lids do not move with their accustomed ease, and the light causes some uneasiness. As the inflammation increases, the whole of the adnata becomes more red, and to that degree, that, in a violent attack, there is not the least appearance of whiteness, neither can any vessel be distinctly seen, but an uniform fiery redness extending over the whole surface; the thickness of it is generally a little increased, and at times it is so much enlarged, as to make the cornea look as if it was depressed or sunk in the globe, which indicates a very violent disease, and has been called chemosis by authors: the sensation of heat becomes greater, and the patient feels as if pins or needles were piercing the eye, with a discharge of tears: the light becomes intolerable, even a small quantity produces great pain, with a copious flow of tears, and the lids are red and swelled. The pain is now not confined to the eye and lids only, but extends to the temple and forehead, and is sometimes diffused over the whole head. The irritation and pain produced are occasionally so great, as to excite a considerable degree of fever, which, at times, though very seldom, is so great as to induce delirium.

"Though the whole of the conjunctiva is generally inflamed, in nearly an equal degree, yet at times the redness is confined only to a small part, the other portion preserving its natural colour and appearance. When this happens, it will usually

usually be found, that either some small extraneous body is adhering to the eye, or that there is a small pustule or ulcer on the adnata.

"The light also, which, even in slight ophthalmies, commonly gives pain, sometimes causes very little irritation, though the appearance of the eye would strongly indicate the contrary; which must arise from the inflammation being confined to the external parts of the eye. On the other hand, in some cases, in which we suppose the tunica choroides and the internal parts mostly to be affected, though the appearance of the conjunctiva shall be little changed, the smallest quantity of light causes great pain."

"The discharge of tears," he observes, "is usually rather copious, and the eye moist; but in some cases the eye has been dry from the beginning, and continues so during the whole of the complaint." We cannot, however, assent to his explanation of this circumstance, that it arises "from the irritation not being so great as to produce the sensation of pain, and on that account the action of the lacrymal gland is not called into undue exertion." From so decided and consistent a Brunonian as our author shews himself to be, we certainly do not expect the opinion of *a spasm* on the ducts of the lacrymal gland brought forward to explain this want of secretion; but, as the secretion of tears does not in general seem to require any "undue exertion" on the part of the gland, we can hardly suppose that, in any case of ophthalmia, there should not be found sufficient irritation to call the gland into action.

The author then observes, that where the inflammation has not been violent, and does not soon subside, the eye becomes accustomed to its new motions, and, without producing much mischief or inconvenience, runs on into the state of atonic or passive inflammation.

Among the symptoms and consequences of the inflammation, when violent and long-continued, its various effects on the cornea, the production of either hypopion, or specks of different kinds, or small ulcers, or, lastly, congeries of red vessels proceeding forwards from the margin of the sclerotica, are next enumerated with accuracy. The power which the patient is able to obtain over the muscles of the eye is curious. "When the thickening of the cornea is towards the centre, and so great as to prevent the passage of the rays of light to the retina, the eye will frequently accommodate itself to its imperfections, by turning on one side, that the transparent part of the cornea

may be opposed to the object, and more perfect vision be obtained. I once saw a person, that had had an inflammation, succeeded by specks in both eyes in succession, some time intervening between each attack, who had obtained such complete voluntary power over the muscles of the eyes, that, the opacity being so situated, as, on directing the axis of both the eyes, to one object, sight was very imperfect, she could turn either or both the eyes to or from the object, or in contrary directions, as she pleased."

In the next section, which treats of the Causes of Ophthalmy, the author premises a pretty clear and full exposition of the leading doctrines of the Brunonian system, modified by some of the opinions of the ingenious author of Zoonomia. The following sentence in this part of the work is very incorrect; "All our motions, whether obedient to the will, or involuntary, together with the various orders of vessels which perform the different functions of the body—*perform their motions* from stimuli of various kinds," &c.

The author takes the often quoted examples of the operation of heat and cold on the body, to illustrate the leading tenets of the Brunonian system, which, as they must be familiar to our readers, we shall not here repeat. The following passage, however, deserves some notice, from the practical inference which is deduced from it.

Speaking of the effect of a burn, he says, "If nothing is done to prevent the ill consequence of the burn, the neighbouring fibres roused into exertion, not only by the stimulus of an extra quantity of heat, but also by the disagreeable sensation arising from the injury done to the capillaries, will be impelled into more frequent contraction, which, producing pain; an increase of stimulus; and if not of the irritable principle, at least of the activity of it; and serum will be secreted, which will arise in the form of a blister. If, on the other hand, cold is applied, as by immerging the part in cold water, it will cause temporary ease; but the pain that follows the withdrawing of the part from the water will be more acute; for the coldness of the water prevents the fibres, already very much exhausted, from regaining their natural proportion of the irritable principle, whilst the neighbouring parts suffer an accumulation of it; and thus every symptom is aggravated. But, on the contrary, if immediately after a slight burn, warm alcohol, or spirit of turpentine, (See Kentish on Burns,) be applied to the part, the first set of vessels, having been previously acted upon, by a much stronger stimulus, will be little affected, but the next

order of vessels will be excited into action, and their irritable principle diminished, when the pain will subside; and in a few hours afterwards, from the natural quantity of irritability being again accumulated, the healthy action of the part returns. When the quantity of heat applied is still less, the contraction of the vessels is increased, and the part becomes slightly red; but as the pain is not so great as to cause much sensation, the pain soon subsides, and the healthy motions return."

We are fully sensible of the importance of the stimulant practice in the deep and extensive burns arising from accidents in coal-pits; a practice which, after being long in empirical hands, was introduced to the public by Mr. Kentish of Newcastle upon Tyne, and by him applied in illustration of the Brunonian system; but we must decidedly protest against this undistinguishing condemnation of cold applications, suggested by theory, and, we will venture to affirm, not supported by experience.

On the causes of ophthalmia, the author observes, that "Inflammations of the eyes may be caused, either by an increase of the usual stimuli, or of a new one superadded;

"Or, by an increase or accumulation of the irritable principle. But to be more particular:

"First, Inflammation may be excited, by any thing which can stimulate the vessels of the eye into actions greater than natural; as,

"A. By violence done to the eye by mechanical means, which seem to produce their effect, from the form and solidity of the particles, destroying the continuity of the part, or from its motion being impeded; as, by blows or wounds in the eye; warts, or encysted tumours, on the lids; an inversion of the ciliary edge of the eyelids; or by foreign bodies inserted between the lids and the globe.

"B. By stimulant and acrid substances.

"C. By those things which affect the eye, as an organ of sense.

"D. By any thing that will increase the action of the lacrymal gland, which, by causing a more copious secretion of tears, will add to the irritation, and particularly if they are confined, as in the measles, small-pox, &c.

"E. By the action of the vessels in the vicinity being increased, as by erysipelatous, and various inflammatory affections of the face; and wounds, or burns, of the same part.

"2. By a stimulus less than natural, and by cold, as by going from a warm room into cold air."

These

These general heads are then enlarged upon, and the particular nature and extent of the operation of the causes of inflammation are laid down with perspicuity and accuracy.

The author denies the existence of genuine variolous pustules upon the eye during small-pox, perhaps without quite sufficient grounds. "It it generally supposed," he observes, "that those opacities of the cornea, which sometimes attend the small-pox, are the consequence of a pustule or pustules being formed there; and judging *à priori*, we might naturally conjecture, that when the face is entirely covered with the eruption, it would be probable the external surface of the eye would not escape. It very seldom, however, happens, that any pustule is found on the tunica conjunctiva; and though I have attended particularly to that subject, I have never been able to detect what I could call a small-pock pustule on the cornea. It is true, on the opening of the eye, there is seen, occasionally, on the cornea, a vesicle, filled with an opaque matter, which has a good deal the appearance of a small-pock pustule; but instead of going off like the other pustules, it continues, or is absorbed the same as a common collection of matter from an ordinary inflammation; besides, it is never seen with the commencement of the eruption of the face, but only after the lids have been closed for several days, which makes it probable that it is the consequence of the confinement of the acrid tears, with the consequent inflammation."

The great difference in the structure of the cornea from most of the other soft parts of the body may, we think, account for the difference observed in the progress and event of a pustule on that membrane, without rejecting the opinion of its being variolous.

As the author enters considerably into detail on this important part of his treatise, we rather wonder at his entire omission of wind as an exciting cause of ophthalmy. The powerful operation both of a cold piercing easterly wind, and of a hot day blast from the sandy deserts of the tropics, have long been remarked by travellers and by writers on this subject.

A distinct set of causes of ophthalmia the author makes to be, those in which "inflammation is induced by the substraction of the usual stimuli for a time, and then from the sudden application of them again in the natural quantity, or perhaps rather greater than ordinary. This, by allowing accumulation of the irritable principle, ultimately brings on inordinate and diseased action;" that is to say, direct debility of the eye is an exciting cause of ophthalmia.

Pain,

Pain, according to this opinion, is made to act a part similar to that which a pupil of the old school would ascribe to the *vis medicatrix naturæ*; for, "in the quiescence induced by the deficiency of stimulus, there is an accumulation of the irritable principle, which is called into exertion by a stimulus less than natural, which, when once brought into action, the fibres are excited into such strong contractions as to cause pain, which acts as a powerful stimulus, and if violent, or long continued, exhausts the irritable fibre, and induces torpor: the irritable principle is then gradually collected, the parts are obedient to their ordinary stimuli, and their motions are performed as usual, and health returns."

This, however, does not always succeed; for we find that "a deficiency of stimulus is by far the most common cause of ophthalmy. On the application of any stimulant substance, the pain that it induces immediately warns us of the danger, and we hasten to remove it; which being done, the very cause that induced the increased action, and which would continue it, is taken away, and the contractions directly begin to diminish."

The habit of body commonly termed scorbutic, and its connexion with ophthalmia, are thus accurately described: "It appears to be a debility, and want of action in the cutaneous vessels, and is marked by a dry and harsh skin, little or no colour in the cheeks, the cuticle by places coming off in powder, or in scales: when the skin is abraded it is a long time in healing; eruptions in different parts of the body are common, especially in those that are most exposed, as the face and hands, sometimes in small red pimples which suppurate; at others, small vesications filled with a transparent fluid arise, attended with an itching and burning; these break, and are succeeded by others: and in this manner it will occasionally continue for months, causing much pain and uneasiness. People of this constitution slowly recover from inflammations of the eyes. It is seldom attended with much pain, unless for a few days at the commencement of the disorder; and though the vessels of the conjunctiva shall be a good deal enlarged, the light causes little inconvenience. A discharge of adhesive matter from the lids, also, is frequent, part of the eyelashes fall off, and the glands ulcerate; indeed sometimes, after the inflammation has repeatedly recurred, it is entirely confined to the lids.

"From the cutaneous vessels having less energy of action than usual, some degree of torpor will take place from a stimulus

mulus very little under the ordinary standard; and it is not uncommon for the patient, though he cannot recollect being exposed to either an unpleasant quantity of heat, or cold, to go to bed with the eyes and eyelids apparently well, and to awake in the morning with the lids inflamed, and firmly closed with an adhesive matter. On carefully cleaning the lids with a little warm water, by evening the inflammation frequently subsides, and the part affected nearly recovers its natural appearance. In those cases, it will generally be found, that the patient, just before going to bed, has been either in a hot room or near the fire, and has gone out of doors, and exposed himself to the cool night air, which has brought on torpor, and a succeeding re-action."

Lastly, the author takes some pains to refute the opinion of ophthalmy arising from metastasis in gonorrhœa, and adduces the authority of Mr. Ware on this point.

From the remote and predisposing causes of ophthalmia, the author proceeds to the proximate cause and the cure. After some conjectures on the proximate cause of inflammation on the general principle he espouses, he gives the various methods of cure, arranged under the different heads of the several exciting causes, the effects of which are to be removed or obviated. With regard to topical applications, he observes, first, that "the common method of applying bandages and compresses on the eye, with the intention of keeping out the light, or preventing the motion of the lids, ought not to be adopted: some also, to prevent, or moderate the inflammation, use poultices of various kinds, or cloths wet with different articles, and bound on the eye, all of which are highly improper and injudicious; for by confining the tears, and increasing the heat of the part, as well as by their pressure, they add much to the inflammation."

This is certainly a useful caution, but which, we apprehend, practitioners are in general sufficiently aware of. The author likewise objects to the use of cold lotions, which are so constantly employed as topical applications in ophthalmia. These, he says, are ordered by practitioners, "not so much, perhaps, on the supposition that they have any specific power in abating inflammation, as to keep the eye more cool, upon the principle that water is a better conducting medium of heat than air; and that the evaporation that takes place from the wet cloth assists in substracting the heat." We would first observe, however, that very many practitioners do attribute to several of these topical

topical applications a power of abating inflammation, not perhaps specific, in the usual acceptation of the term, but certainly much superiour to the operation of any simple evaporable fluid. The author, however, goes farther; for, in answer to the passage last quoted, he observes, that "this mode of reasoning is fallacious; for although it is well known, that a certain quantity of water will transmit heat, quicker than a given quantity of air, and that the evaporation which is always going on from water, makes it in summer two degrees cooler than the air, and that even a bottle, containing liquor, and wrapped in a wet cloth, becomes cooler, as is well known in hot climates, where they cool their wine by that process; yet the analogy will not hold good when applied to the animal body.

"In one case there is a certain quantity of heat contained in a body, which is of a temperature nearly equal to its own, which is diminished by the evaporation of the water; in the other, the wet cloth is applied to a body, at a much higher temperature, and whose heat is being perpetually renewed.

"A wet cloth being placed in contact with an inflamed part, in two or three minutes becomes the heat of the skin; and the external part of the cloth, which I will suppose to be four or six folds, will be found, in trying it with a thermometer, both before and after the application of the cloth, to have sunk only two degrees; and even this small diminution of heat must not be attributed to the skin being cooler, but to the heat substracted from the external surface of the cloth by evaporation, as we find that, in warm weather, water is that much cooler than the air."

It seems a singular assertion, that the cooling process of evaporation will have no effect on "a body of a much higher temperature than the evaporable fluid, and whose heat is being perpetually renewed." The author is not ignorant that in active inflammation the heat of the inflamed part is both higher, by the thermometer, than the rest of the body; and is constantly given off, to all appearance, in unusual quantity, from the seat of inflammation. Now it would certainly appear a very rational method of reducing this unusual heat to the natural standard, constantly to supply the inflamed surface with an evaporable fluid; in the same way as the chymist would put a wetted cloth upon the head of his alembic. At least this appears not an improbable origin of this practice in inflammation; and we cannot but think that much benefit is often derived from it, where sufficient attention is paid to the

 mode

mode of application. We entirely, however, agree with the author in the next paragraph, that "the wetted cloth soon becomes dry and hard, and," (if the moisture be not renewed,) "it acts as a stimulating substance independent of its weight, producing thereby irritation, and an increase of the inflammation." It is rather unfortunate, that in this respect the saturnine washes have, as we have often observed, such a property of stiffening cloths which have been wetted with them and again dried; an inconvenience which is often particularly felt in ophthalmia.

Instead of cold water, the author recommends warm water to be assiduously applied in active inflammation of the eye; a practice which, he acutely observes, though it appears inconsistent to a superficial observer, is reconciled to the patient's ideas when introduced under the disguised name of fomentation.

Some very sensible observations on that troublesome cause of ophthalmia, the trichiasis, or inversion of the eyelid, occur in the last chapter of this work, in which the author bears testimony to the accurate and judicious view of the subject given by Mr. Ware in his valuable publication.

In washing the eye, with a view of clearing out any extraneous particles, the author prefers employing a common wine-glass to the common eye-cup, and advises to immerse the eye by holding the head down over the glass. He particularly cautions against the dreadful effects of lime which sometimes gets within the eye, and, among other applications, he recommends the use of vinegar diluted with three or four times its bulk of water, with a view of neutralizing any adhering particle of the lime which may not be washed off.

The last passage which we shall give our readers is the author's method of treatment in accidents of the eye which are not uncommon, and which are often attended with very serious consequences. "In the town of Birmingham, where I reside, whose inhabitants are chiefly employed in the working of metals into a variety of articles, pieces of steel are often struck off their tools into the eye, and from the defence afforded the eyes by the lids, the steel generally pierces the cornea, where it is either buried between its laminæ, or sticks in it, presenting a sharp surface to the irritable membrane which lines the lids.

"The metal, in general, is very small in quantity, forming only a minute dark speck; and as, from the violence of the blow,

blow, it flies off in a heated state, the cornea is burnt, yet from the smallness of the particle, on its being speedily removed, no perceptible opacity remains. It is always desirable to have it immediately extracted; for though, if left in the eye, nature would remove it by suppuration, yet on that account the danger of its inducing an opacity, which might hereafter prevent perfect vision, is very much increased.

"The method I take to extract particles of steel from the eye, is with a small straight-bladed knife, made rather thick in the back, and not brought to a very fine point. Taking this in my right hand, whilst with the left I draw down the lower lid, the patient's head being supported by an assistant who stands behind, and elevates the upper lid, on the point of the knife being placed under the particle of steel, it generally, on the first or second attempt, is disturbed, and the point of the knife, having been previously well rubbed on a loadstone, attracts the steel, which is immediately removed. This knife I also find very convenient for extracting extraneous bodies of different kinds, and from its form and strength much preferable to a lancet. The lancet is awkward to turn about in the hand, and having a double edge, often wounds the edges of the lids; it is also brought to so fine a point, as frequently to do considerable injury to the eye."

A few observations on the ophthalmia arising from small-pox conclude the first part of this treatise, which has afforded us considerable interest in the perusal, and shews a familiar acquaintance with the various forms of this distressing complaint. The theoretical opinions which are prominent in almost every page, are given with as much consistency and precision as can be expected in a work of this nature; but we cannot help observing a want of method, and a degree of confusion in the arrangement, which in some degree would perplex one who reads merely for information. We may also remark, that the author has, in many instances, not sufficiently attended to accuracy of expression. We are led to expect some valuable practical information in the remaining part, which, we doubt not, will interest the medical reader; but, as a necessary guide to those observations, the important fruit of long practice, which gives the greatest value to treatises of the kind before us, we would suggest the necessity of a copious index, or table of contents, to be added to the whole.

ART. III. *The Anatomy and Physiology of the Horse's Foot concisely described; with practical Observations on Shoeing; together with the Symptoms of, and most approved Remedies for, the Diseases of Horses. With fourteen illustrative Plates. Dedicated, by Permission, to the President, Committee, and Members of the Commercial Travellers' Society.* By JAMES WHITE, Veterinary Surgeon to his Majesty's First, or Royal Dragoons. Duodecimo. 160 pages. CHAPMAN, London. 1801. Price 4*s*.

IT is with peculiar pleasure that we notice every attempt at the extension of veterinary science, a branch which, we fondly hoped, would, ere this time, have made a much greater progress in a country abounding with the finest and most useful animals in the world. No blame, however, can possibly attach to the Veterinary College, an institution highly laudable in itself, and which seems to have been conducted upon the best and most scientific principles.

Mr. White, in this publication, has obliged the world with a real *multum in parvo*, a small and unexpensive work, containing a respectable quantity of well-selected and useful information, which many of the profession may find their account in perusing; but which will be of still greater consequence to the common farrier, to whose service, from its conciseness and perspicuity, it seems admirably adapted.

The author professes (page 152) to have described all the diseases and remedies with which he is acquainted from experience; a circumstance which, no doubt, greatly enhances the value of his communications. If the work contains nothing new, the established practice is generally exhibited in a clear and advantageous light; in fact, no material or fundamental change in the principles or practice of the veterinary science has obtained for a considerable number of years, either in this country, or France; nor is it probable, under the present circumstances, that attempts at novelty and discovery can be attended with so great public benefits, as the general promulgation of an established practice, which seems to rest upon a truly philosophical base. Those particulars in which the author appears to have been misled, will be pointed out with a freedom absolutely demanded by the nature of the case.

Mr. White very properly begins with the anatomy and physiology of the horse's foot, the diseases of which he attributes generally, with great truth, to bad shoeing and improper management.

Page

Page 2. "The bad effects which arise from the common practice of shoeing are so gradual, that we can easily account for their having been so generally overlooked. The gradations between soundness and absolute lameness are so numerous, that it has been found rather difficult to trace the disease back to its source; and this cannot be done readily without having some knowledge of the structure of the foot, and the particular uses of the various parts which compose it. It is necessary also to be well acquainted with the natural form of the foot, in order to determine how far it has been altered or destroyed by any plan of shoeing: for example, take a horse that has a sound, well-formed foot; let it be improperly pared, and let bad shoes be applied, in all probability lameness will not be the immediate consequence; by a repetition, however, of this practice, it will be found that the original shape of the foot is gradually altered, and that eventually it will be so far deformed, as to produce, perhaps, incurable lameness; therefore we ought not to be satisfied with a plan of shoeing, merely because a horse is not immediately lamed by it, but should examine also the effect produced by it upon the shape and structure of the foot; and this rule may invariably be depended on, that any mode of shoeing and treating the foot, which has a tendency to alter the form given to it by nature, is highly absurd and destructive; while that practice which tends to preserve its original form is founded upon sound and rational principles." No reasoning can be more just, or more applicable to present circumstances.

Mr. White repeats the reasoning of the late M. Sainthel, in objection to the theory of La Fosse, that the frog is intended by Nature as a fulcrum, or salient point to the flexor tendon, or back sinew. None of the late arguments, however, seem to bear successfully against the idea of La Fosse: admitting the existence of other auxiliary supports, the frogs are obviously, from their nature and position, whether they come in contact with the ground or not, destined to the office of an elastic stay to the tendo Achillis. To what more important purpose could Nature have destined them? In truth, a foot devoid of frogs, or having their space filled up with solid, immoveable, ungular substance, would afford a very slender support, or impart a very small share of activity to the back sinews.

Page 22. The fashionable notion of the necessity of the frog's receiving pressure, in order to keep it firm and healthy, is

is acceded to. But a very little reflection will serve to deprive this position of all consequence. It would be every whit as much to the purpose to place great stress on the necessity of the crust also receiving pressure. To speak rationally and practically, the foot is always more sound and strong, when supported by a frog which occasionally comes in contact with the ground. As to the frog itself, we see innumerable examples of its perfect sanity, notwithstanding that either Art or Nature may have interdicted all possibility of pressure. In the deep and narrow hoofs of southern horses, particularly whilst upon their own arid soil, the frog, in many instances, is never of sufficient size to reach the ground. Amongst the horses of this country, the frogs of many are naturally too tender to endure pressure or concussion; which, instead of dryness and soundness, is, in these, much more probable to induce inflammation and defluxion.

Mr. White's rules for shoeing are, in general, good, and the models correct; he might, however, have advantageously recommended a moderate concavity of the external surface of the shoe, particularly calculated for the pavement of the metropolis.

Page 29. The arguments against the barbarous practice of drawing the sole, (too frequently recurred to on the Continent, on even slight occasions,) appear conclusive, and are very creditable to Mr. W.

Page 53. The doctrine of the inelasticity of tendons is attempted to be supported with the usual arguments; but previously to decision, the author would have given his readers more satisfaction, by a refutation of what Mr. Lawrence has said upon that subject, in his general Treatise, vol. ii. p. 532.

The doctrine held out, (page 55,) respecting relaxation of sinews, although fashionable enough, does not appear accurate, and, with a view to the ordinary practice and ideas of farriery, may not be quite free from danger: nor is there much correctness in the idea, (page 61,) that inflammation is the essence of a strain. It is doubtless a general concomitant, and happy indeed is the veterinarian who removes the strain with the inflammation. The prescription of powdered glass, in the case of a film upon the external coat of the eye, ought to have been attended with a caution: farriers and grooms, into whose hands the book may fall, by no means persons of the largest share of discrimination, are extremely attached to this old remedy, whether

whether the malady be externally or internally seated. The quittor, curb, &c. are too superficially and confidently treated. A thorough practical acquaintance with horses of the meanest class would convince the author, that the glanders from contagion is rare indeed, compared with the spontaneous disease; nor does the notion of a convertibility of glanders into fascy, by inoculation, argue much nosological correctness.

The conjecture (page 111) that cow-pock inoculation will render a horse insusceptible of glanders, is truly curious; and so great a discovery ought not to be confined to a single object: suppose it were also tried as a preventive of blindness and corns!

The chapter on purging physic is liable to more objection than any other part of the book. Our modern authors of repute are by no means reprehensible on the score of recommending drastic, or too violent purges; nor are their cautions against common aloes without just grounds; it being notorious, that the mischiefs done in this way, by grooms and farriers, arise generally from the quality rather than the quantity of these prescriptions. It is probably an inadvertent assertion of Mr. W. that salts and cremor tartar will produce no effect upon a horse; they always act as powerful diuretics, rendering the fæces soft, but not liquid like the common purgatives. The substitution of prepared natron for these is obviously a change without improvement; the formulæ are strangely defective in point of quantity. Even N° 3, the strongest, can scarcely be expected to have any purgative effect upon a horse of middling strength; and many years occasional experience in purging horses of all descriptions, has proved ten drachms of succotrine aloes to be a mild dose for a horse of delicate habit, and a most insufficient one for the robust. As to aloetic alterants, aloes exhibited in that mode would too probably have a very debilitating effect upon the intestines.

Page 144. The omission of sulphur is, perhaps, no amendment of the old cordial ball; the articles recommended, by themselves, are extremely heating, and liable to much abuse on that account.

The alterative powders want correctives for horses of delicate stomachs; it can seldom be necessary or proper to administer aloes in a liquid form. Could the author give infallibility, or even tolerable assurance, to his table of discriminating symptoms in colic, page 91, he would deserve highly of the profession indeed. No doubt but Mr. W. and every rational veterinary surgeon, will

will be convinced of the necessity of proving the pretensions of authority by their own practical experience, and, as a most important point, of obtaining a critical skill in the effects of labour upon the general organization of the horse.

ART. IV. KLAPROTH'S *Analytical Essays on mineral Substances.*

(Concluded from page 127.)

THE author, in his thirty-third Essay, gives us the analysis of *pumice-stone.* Many of those who have analyzed this fossil, consider it, with Bergmann, as an asbest changed in its mixture by volcanic fire. This opinion seemed to be justified, partly by its fibrous texture, partly, and especially, by the portion of magnesia that has been supposed to exist in it. But notwithstanding Bergmann, Cartheuser, and but very lately, Spallanzani, have mentioned magnesian earth, in their analysis of pumice-stone, as a constituent part, our author is convinced, by his own experience, "that it does not, in the least, enter into this fossil. The supposed origin of pumice-stone from asbest is, therefore, unfounded; and, along with this false derivation, likewise, another difficulty of some weight is removed, which seemed to oppose the instructive theory of the matrices of pumice-stone given by Nose."

His analysis of the common pumice-stone from Lipari afforded him 77.50 parts of silex, 17.50 of alumine, 1.75 of oxyd of iron, besides a trace of manganese.

"A few years since, the public has become acquainted with an arenaceous, or sandy fossil, under the name Austral sand, which has been found near Sidney Cove, in New South Wales, and was brought from thence to England. This fossil has been asserted to contain a new, distinct, peculiar earth, denominated Austral earth (Sidneia, Cambria,) upon the ground of its analysis made and published by Jos. Wedgwood; of which the following are the principal particulars. The principal character of that earth is said to be, that it resists all acid and alkaline menstrua, strong muriatic acid only excepted, which alone, by means of repeated digestion, takes up this earth from that arenaceous fossil. It is also said to be again precipitated from its muriatic solution, merely by dilution with water; and to be, after this, absolutely insoluble in any other solvent but the muriatic acid, with the assistance of heat."

Our

Our author, however, examined this sand with attention; but silex, alumine, and a little iron, were all the principles he was able to discover in it; there being no trace of any new earth.

He observes, (Essay thirty-fourth,) that although in this inquiry he has been obliged to confine himself "to the small quantity of thirty grains, without being able to repeat it for want of a greater stock of this mineral, yet its result is sufficient to excite a very reasonable doubt of the real existence of such a new earth as is pretended to be met with in austral sand. Time will shew whether this doubt may be removed, or confirmed, by repeated and more accurate analyses. If the last should be the case, the illusion which led to that erroneous supposition may, perhaps, be explained in the following manner:

"Mr. Wedgwood does not tell whether he had filtered, to perfect clearness, the muriatic acid employed for the extraction of the fossil, and previously to its being mixed with water. The contrary seems rather to have taken place; for he says that the fluid turned white when he added water to the acid, for the purpose of diluting the acid, and edulcorating its remaining part. It is therefore probable that the earth, let fall by the acid on the admixture of water, was nothing else but alumine, still chemically combined with silex, which, during the long and hot digestion, had been taken up by the muriatic acid, and was now deposited in the water."

Since our author published this analysis, Mr. Hatchet has analysed the *terra australis*, and confirms the opinion of Klaproth, that it contains no new earth. Mr. Hatchet's analysis afforded him silex, alumine, oxyd of iron, and plumbago.

The thirty-fifth Essay contains an account of the *granular sulphated barytes* from Peggau. "The granular baroselenite, or sulphat of barytes, is one of the rarer species of this genus of ponderous earth. That of Peggau, in Stiria, which is the subject of this essay, occurs of a beautiful milk-white colour, is massive, resplendent, finely-grained, semi-indurated, and brittle. It bears a very strong resemblance to the white, fine-grained Carara marble; to such a degree indeed, that, by its mere appearance, it might easily be mistaken for it, were it not for its greater specific gravity, which is 4.380, and by which it is readily distinguished."

One hundred parts of this fossil were found by Mr. K. to contain 60 of barytes, 30 of sulphuric acid, (free from water,) and 10 of silex.

 "It

"It was, undoubtedly, the powerful attraction which the barytic earth has for sulphuric acid, exceeding even that of the pure fixed alkalis, that induced the deserving Scheele, who first discovered it as a distinct earth, to think that an alkaline salt is incapable of resolving the natural mixture of baroselenite into its separate principles. On this account, when attempting to expel its sulphuric acid, he resorted to the imperfect and tedious process of repeatedly working the stone to a paste, with honey or oil, of calcining that mass by means of the muriatic or nitric acids, and, at last, of extracting such a part of it as had been disengaged from the sulphuric.

"Yet there are several instances where the unassisted force of attraction of pure alkali has been too weak to separate the component principles of mixed bodies; while, on the contrary, when they have been employed in the carbonated, or otherwise neutralized state, the desired object has been attained by this new increase of attractive force.

"This is the very case with ponderous spar, and is founded on the method learnt of Wiegleb: which is, to decompose it in a shorter, cleanlier, and more complete manner, by igniting it with carbonat of potash. This method, as to the most essential part, has since been universally approved and adopted.

"It seems, however, to be the common opinion, that this decomposition obtains in the dry way only, and that the separation of sulphuric acid from barytes absolutely wants the support of red-heat."

The result of our author's analysis of the testaceous sulphat of barytes from Freiberg, which is given in the thirty-sixth Essay, "demonstrates, that the humid way is likewise applicable in the decomposition of ponderous spar, by means of alternate boiling with a concentrated aqueous solution, of carbonated potash, and subsequent solution in any suitable acid.

"This management affords, especially in operations performed with great quantities, a double advantage. The first is, the saving of crucibles, which would be otherwise destroyed; the second is this, that the remaining alkali, which ought to be recovered after the separation of the newly-formed neutral sulphat, is not liable to be contaminated in this method.

"When ponderous spar is ignited or fused with potash, that part of the alkali which is not neutralized, during the process, by the sulphuric acid of the fossil, will attack not only

only the siliceous and argillaceous earth, which are usually contained in the ponderous spar, but also that which enters into the substance of the crucible. It will also retain a great part of those earths, in a dissolved state, in proportion as the alkali, during ignition, gives out its carbonic acid, and becomes more or less caustic. On the contrary, if the process of boiling be employed, no transition takes place in the alkali, from the mild or carbonated, into the caustic or pure state; hence also no contamination of it with silex and alumine will arise."

In the thirty-seventh Essay we have the analysis of the *staurolite*, or cross-stone, which was found to consist of 49 parts of silex, 18 of barytes, 16 of alumine, and 15 of water.

In the thirty-eighth Essay, the author presents us with some farther observations on witherite and strontianite. He gives us an analysis of witherite, (from Anglezark near Chorley in Lancashire,) from 12 ounces of which mineral he procured 5659 grains of carbonated barytes, 98 of carbonated strontian earth, 0.50 of carbonated copper, 2.50 of alumine contaminated with iron. This analysis serves to confirm the existence of a slight trace of copper in the English witherite, which has been already observed by Westrumb, as well as the presence of strontian earth, both in the English and Siberian witherite; which last was noticed by Lowitz.

At the conclusion of this Essay, our author notices the relations of barytes to prussiat of potash. "The precipitation effected by this last, of barytic earth from those acids with which it forms soluble middle salts, has," he observes, "several times occasioned erroneous conclusions. It was upon this, that Bergmann and others have founded their hypothesis, ascribing a metallic nature to that earth, already refuted by more accurate examinations. With no better reason, has even lately one of the principal French chemists reckoned the precipitation of barytes by Prussian alkali, among the characters which distinguish it from strontian earth. However, this precipitation does not take place, except when the prussiated potash employed, is not entirely free from the neutral sulphat, which usually contaminates it; for, if the prussiat is perfectly pure, it is as little capable of precipitating barytes as any other of the simple earths."

This opinion, however, is contrary to the experience of Mr. William Henry, who, in the fourth volume of Nicholson's Journal, has pointed out an excellent method of preparing pure

prussiat of potash, which he effects by decomposing prussiat of barytes by carbonat of potash. By means of prussiat of potash prepared in this manner, Mr. Henry obtained a copious precipitate of prussiat of barytes, in crystals, from the muriated barytes. This fact seems to prove, that a double elective affinity is exerted between muriat of barytes and prussiat of potash. In this respect, barytes differs from the other earths, and approaches the metals.

"After the strontian earth had been established as a peculiar, chemically-simple earth, it was to be expected, that it might likewise occur combined with sulphuric acid, instead of the carbonic, as is the strontianite from Scotland. This conjecture was already in part verified; as it has been found, that most of the ponderous spars contain sulphated strontian earth in their mixture, though in only a small proportion, not amounting in the baroselenites, hitherto examined with this view, to more than from one to two per cent."

But the analysis given in the thirty-ninth Essay fully proves the existence of a perfect neutral sulphat of strontian, without any portion of barytic ingredient.

The fossil in which our author discovered this combination, has been known but a few years; it first obtained the name of *blue fibrous gypsum*, and was found at Frankstown, in Pennsylvania. The specific gravity of this fossil is not less than 3.830, which naturally suggested a doubt of its belonging to the species of gypsum, and induced mineralogists to consider it as a fibrous sulphat of barytes. That neither of these are its proper place in the mineralogical system, will appear from our author's analysis, which afforded him 58 parts of strontian earth, 42 of sulphuric acid, and a slight trace of manganese.

In the fortieth Essay we have a very interesting account of the water of the boiling spring at Rykum in Iceland, the greatest part of which we shall present to our readers in the author's own words.

"Considering," says he, "the slowness, with which the knowledge of the chemical properties of even the most common natural bodies usually advances, it is not surprising, that even those of siliceous earth have so long remained but partially investigated. This earth has always been considered as a substance, by itself, absolutely insoluble in water. It was, therefore, totally neglected in hydrologico-chemical inquiries, or researches into mineral waters, until Bergmann directed the attention

attention of chemists to its solubility in simple water, and demonstrated that it exists in a state of solution in the Geyser, and other boiling springs of Iceland.

" But although, in this instance, this celebrated philosopher justly considers the heat, which the water of those springs possesses when it rises into day, (and which even then is higher than that of ordinary boiling,) as a means of promoting the solution; yet experience has shewn, that an actual solution of silex in water takes place, not only in springs, the natural temperature of which is much inferior to the ebullient heat of those in Iceland, but also in several other mineral waters; and even that some common sweet-water springs contain dissolved siliceous earth.

" Thus, when I was attentive to this point, whilst analysing the mineral waters of Carlsbad, I found that 1000 cubic inches of the main spring contain 25 grains of silex, actually dissolved.

" That this is not the greatest quantity of siliceous earth soluble in water, and that, especially, the hot springs in Iceland might possibly contain a much larger proportion of it, I was led to conjecture from the siliceous tufas which they deposit in considerable quantities. At that time, however, a proof of this opinion, supported by chemical investigation, was still wanting. It gave me, therefore, the greatest pleasure, when I received a sufficient quantity of water of one of the principal Icelandic springs, which enabled me to perform this inquiry, and to compare its result with that of the analysis of Carlsbad water.

" In modern times, Uno von Troil, and, after him, Banks and Solander, have particularly deserved well of the natural history of Iceland, so remarkable in several of its individual subjects, some of which are unique in their kind. The latest voyage to that island, undertaken for the purposes of natural history, is that of Stanley, in the year 1789. This learned traveller, (who has given in the papers of the Royal Society of Edinburgh a circumstantial description of the spring at the Geyser,) when collecting the natural products of that spot, had likewise providently brought back with him a number of bottles filled with the water of those ebullient springs. Two of these, that came to my hands, served for the following analysis.

" The water contained in both bottles is from the spring at Rykum. From this spring, twenty-four English miles distant from Hafnifiord, the water rushed formerly out to the height

of

of sixty or seventy feet. But since the orifice of the spring has been covered, for the greatest part, by an overthrow of the rock, the stream of water, at present, spouts off sideways, from fifty to sixty feet. The heat of this spring, even after the jet, is still so intense, that Fahrenheit's thermometer rises to 212°. Therefore, as it is beyond a doubt, that part of the heat is lost during the spouting, and, consequently, that the water must have been some degrees hotter in its subterraneous reservoirs; Nature affords us here an instance, in the large way, of what Art performs in the small, by Papin's digester: namely, that confined water, even while in its unelastic, dense, liquid state, is capable of acquiring a degree of heat, surpassing that of its boiling point.

"The water, in both bottles, was clear, bright, without sediment, and without taste. Yet, at the spring itself, it shewed some sulphureous ingredient, according to Stanley. For, when employed fresh from the spring, it gave to the infusion of tea prepared with it, as well as to the meat boiled in it, a nauseous taste; whereas, the water from the spring at the Geyser, used in the same manner, gave no sign of it. But as, in the water which I examined, I could not discover any sulphur, either by the taste, by the smell, or by reagents, it remains undecided, whether this effect proceeded from a portion of highly volatile, sulphurated, hydrogen gas, only observable at the spring itself, or whether, perhaps, the smell produced by putrescent, organic substances has not been mistaken for it; which last is not seldom the case, with various waters, supposed to be hepatic.

"On employing other reagents, it appeared, that this water from Rykum contains neither free carbonic acid, nor iron, nor lime, nor magnesia; and that carbonated, muriated, and sulphated soda, are to be expected.

"Guided by these previous indications of the constituent parts of this water, I performed its analysis in the following manner.

"I evaporated a hundred cubic inches of it in a gentle sand-heat. When this quantity had been reduced to a remainder of about six cubic inches, I found it coagulated to a pale-brownish, stiff, somewhat turbid jelly. This evidently shewed, that this water had contained a considerable portion of dissolved siliceous earth, which now appeared in its usual gelatinous form. After the evaporation had been carried on to perfect dryness, the powder which was left, weighed $25\frac{1}{2}$ grains.

"To separate the siliceous earth from this residue, previously

ously to the subsequent operations, I poured water upon it, and when softened, I threw it upon the filter, washed the separated earth, and exposed it to a moderate temperature, to dry. It appeared in a delicate, loose, pulverulent state, and weighed nine grains. To discover whether it was pure, or mixed with any other soluble earth, I digested it with muriatic acid; but when this was again filtered off, it contained nothing extraneous, except a trace of aluminous earth, hardly worth noticing.

"Hence, the salts still held in solution, deducting the nine grains of silex, amounted to 16½ grains. Concentrated acetic acid was then dropped into the liquor to the over-saturation of the soda; and when the mixture had been evaporated to dryness, I separated, by highly rectified alkohol, the acetite of soda thus produced, and found the weight of the residue, again desiccated, to be 13½ grains. From this it followed, that the ingredient, carbonat of soda, reckoned in its dry state, amounted to three grains; which are equal to eight grains of crystallized mild soda.

"Those 13½ grains, which yet remained, were liquefied in a little water, and the solution left to spontaneous evaporation. It gave crystals of muriated and sulphated soda. To find the proportion of these two salts to each other, I redissolved the mixture in water, and decomposed it; first by acetated barytes, and then by nitrated silver. Calculating afterwards the quantities of the precipitated sulphat of barytes, and muriat of silver, upon the basis of other comparative experiments, I found, that in those 13½ grains were contained, 8½ grains of common salt, and five grains of Glauber's salt, reckoned in its dry state, or 12 grains, if crystallized.

"According to this, the above 25½ grains of salt, afforded by 100 cubic inches of water from the boiling spring at Rykum, when deprived of their water of crystallization, or in the desiccated state, consist of:

Carbonat of soda (natron) . . .	3 grs.
Sulphat of soda (Glauber's salt) . .	5
Muriat of soda (common salt) . .	8.50
Siliceous earth	9
	25.50

"Dr. Black asks, 'How and by what means is the siliceous earth dissolved in water?—Is the hot water, of its own accord, possessed of the power of dissolving this earth? or can this be effected only by the means of the intervening alkali?'

'alkali?'—In answering these questions, he does not approve of Bergmann's opinion, that the solvent power of water, assisted by heat, is alone sufficient for this effect. He rather thinks, that the alkali is the efficient cause of this solution, and the heat merely a means of promoting it. In his opinion, a chemical combination of the silex with alkali is always present, when water exerts a dissolving power on the earth; and this idea he supports by the example of the agency of hot aqueous vapours upon glass. The doubt, which might be raised against it, from the disproportion of these two substances to each other in the Icelandic hot springs, he wishes to obviate by stating, that the silex had originally been united in them with a much larger portion of alkali; but that, subsequently to the solution of this compound in water, part of the alkali had again been neutralized by acids, or acid vapours, that combined with the fluid. But there is no necessity for this mode of explanation; as it is manifest by several facts, that siliceous earth alone, if under favourable circumstances, is soluble in water, without the concomitant aid of alkaline salt.

"Moreover, this opinion, that the silex exists in the abovementioned springs in a state of chemical solution by soda, seems likewise to have led Dr. Black to presuppose this alkali in those waters in the caustic or pure state, that is, free from carbonic acid; because it is allowed on all hands, that, in this state only, is it capable of effecting this solution. Yet, not to mention that no proof is given of this hypothesis, there occurs no instance in nature, upon which to establish its probability. The very effervescence, that ensued on saturating with acetic acid the saline residue left by the evaporated water, would prove the contrary; unless, indeed, it be objected to this argument, that the alkali had attracted the carbonic acid, during the evaporation of the water."

In the same manner that mineral waters impregnated with lime, deposit the *calcareous tufa*, in various forms, so the hot springs of Iceland deposit their *siliceous* ingredient in the form of *tufa*.

In the forty-first Essay, we have the analysis of the *siliceous tufa* from the Geyser, which was found to be composed of 98 parts of silex, 1.50 of alumine, and 0.50 of oxyd of iron.

In the forty-second Essay we have an analysis of the *elastic quartz*, or flexible sandstone, from Brasil. "The singular elastic flexibility, so seldom occurring in the mineral kingdom, in which this fossil, in its form and appearance, resembles novaculite, (Turkey hone,) has," Mr. K. observes, "attracted

tracted the attention of naturalists, but at the same time has led many persons to doubt its existence as a natural substance, and to suspect, that this may probably be a product of art. It comes from Brasil, near Villa-rica, the principal town of the province of Minas Geraës, which fact was, for a while, kept a secret. There, it occurs in not very thick strata, whose hanging and shading sides are cased over by a gray crust of ¼ inch thick; and from thence it was brought to Portugal the first time, in the year 1780, by the Marquis de Lavradio, Viceroy at Rio de Janeiro. Among the specimens I have seen, that of the Imperial Cabinet at Vienna, so remarkable for its precious fossils, is by far the greatest; it being 26 Vienna inches long, 16 inches broad, and 1 inch thick. It is, however, probable that this stone, together with its remarkable physical property mentioned before, was already known in the sixteenth century; and that it is the same with that described by Gassendi in Vita Peireskii in the character of a flexible whetstone (novaculite;) as suggested by the authors of the Göttingische Gelehrte Anzeigen, when this stone has again been brought into notice."

Our author is "inclined to think, that the elasticity of this fossil originates solely from the form of its aggregation. For, as may be distinctly seen at the first glance in the entire stone, all those longish lamellæ are interwoven in one single direction, and implicated in such a manner, that each junction resembles a vertebra, or hinge. With this idea also corresponds the particular kind of the flexibility of the stone, which is not tough or coriaceous. For, if the stone be held upright and shaken, it vibrates with some noise to and fro; but as soon as its agitation is discontinued, its parts conjoin again firmly by a force like a spring."

According to the analysis here given, one hundred parts of this elastic quartz contain 96.50 of silex, 2.50 of alumine, and 0.30 of oxyd of iron.

"There are sometimes very small blackish grains, like points, mingled with this stone. As these probably are garnets, or crystals of horn-blende, it seems that the portion of iron and alumine discovered in the fossil chiefly proceeds from them."

The forty-third Essay contains the chemical examination of the glass-stone, (hyolite,) from Dauphiny. In the forty-fourth the author examines the *crysoprase* and its concomitant green earth. The forty-fifth contains the analysis of the noble opal from Cscherwenitza in Upper Hungary. "If," observes the author, "the noble opal, effulgent with variegated colours

 (chatoyant,)

(chatoyant,) be contrasted with the colourless rock-crystal, and the dull, dark-coloured flint, it would hardly be possible, were it not for the conviction afforded by chemical experience, to be persuaded that the chief constituent part of those three species of stones, so dissimilar in their external appearance, is the same simple, pure, siliceous earth, or, at least, only in exceedingly small proportions, mingled with foreign ingredients; and that it is only the difference in the state of aggregation which modifies the one to opal, the other to rock-crystal, and the third to flint.

"But that the noble opal really belongs to the purest sorts of silex, is demonstrated by the following analysis."

He then presents us with the results of his experiments, from which it appears that 100 parts of this opal consist of 90 of silex and 10 of water.

In the forty-sixth Essay we are presented with the analysis of the *Saxon hydrophanes*, a variety of opal, known by the names of changeable opal, and oculus mundi, "which possesses the remarkable property of becoming transparent in water or other fluids: those from Saxony are, besides, particularly distinguished by the beautiful opalescent play or change of colours, which they exhibit in that situation, of which some exhibit sensible indications, even in their natural dry state."

This stone, according to Mr. K. contains 93.125 parts of silex, 1.625 of alumine, and 5.250 of volatile inflammable parts, and water.

"If this hydrophanes, after complete expulsion of its aqueous moisture, be steeped in melted wax or spermaceti, in which state of artificial preparation it is called pyrophanes, it acquires the property of being quite translucid, and of a brown yellow or gray colour, when heated in a spoon upon a charcoal fire."

In the forty-seventh Essay we have an analysis of the white and green opal from Kosemutz: the forty-eighth contains an account of the yellow opal from Telkebanya; and in the forty-ninth is given the chemical examination of the brown-red semi-opal from Telkabanya.

The fiftieth Essay contains the analysis of *menilite*, which, in the systematic arrangement of minerals, has been formerly reckoned among the genus of clay, and accordingly placed as a variety of pitch-stone, with the name of blue pitch-stone. Against this, Mr. K. observes, "an anonymous author has started some doubts, in a letter to De la Metherie, in consequence of experiments which he has made, by moistening some

some pieces of the stone, and exposing them for several months to open air; upon which he found, that sulphat of magnesia had gradually been formed. By this he was persuaded, that this species of stone belongs to the magnesian genus, and should be added to the steatites, serpentine and pot-stone."

With what propriety this has been done, will appear from our author's analysis, which gives 85.50 parts of silex, 1 of alumine, 0.50 of oxyd of iron, 0.50 of lime, and 11 of water and carbonic matter, as the component parts of menilite. From hence "it is obvious, that this fossil can, by no means, belong to steatites, or to serpentine, or to the pitch-stone, as the proportions of those ingredients, in conjunction with the infusibility of menilite, sufficiently prove. Perhaps this fossil may be considered as a variety of the semi-opal, approaching to flint."

The fifty-first Essay contains an examination of the *polishing slate* from Menil Montant; the fifty-second, of the *silici-muriat* from the Levant; the fifty-third, of the *semi-indurated steatites* from Bareuth; the fifty-fourth, of the *steatites*, or soap-rock, from Cornwall; the fifty-fifth, of the *Chinese agalmatolite*, or plastic stone.

In the fifty-sixth Essay we have an addition to the examination of the lepidolite, already noticed in the nineteenth Essay. The author informs us, that this second examination discovered to him in this stone, 4 per cent. of potash, which he had not found in it before. This may in some measure account for the fusibility of this stone.

The fifty-seventh Essay is extremely interesting; it contains an account of a new metal discovered by the author, in a stone which has been generally called the pitch-blende. This metal he has denominated *uranium*, or uranite, "as a kind of memorial, that the chemical discovery of it happened in the period of the discovery of the new planet *Uranus*," (the Georgium Sidus of Herschel.) According to the analysis here given, the pitch-blende, or black ore of uranium, from Joachimsthal, is composed of 6 parts of sulphat of lead, 5 of silex, 2.50 of oxyd of iron attractible by the magnet, and 86.50 of uranium.

In the fifty-eighth Essay we have the examination of two newly-discovered *titanites*; in the fifty-ninth, an analysis of some ferruginous or irons-hot titanites. The sixtieth contains an account of the garnet-shaped ore of manganese; the sixty-first, a chemical examination of the native oxyd of tin; the sixty-second, of the native sulphuret of tin; the sixty-third, of

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the *molybdat of lead* from Bleiberg; the sixty-fourth, of the sulphuret of copper, from Siberia; the sixty-fifth, of the *variegated* or *purple copper ore* of Kirwan; the sixty-sixth, of the Siberian malachites; the sixty-seventh, of the bismuthic silver-ore, from Schapback, in the Black Forest; which was found to consist of lead, bismuth, silver, iron, copper, and sulphur.

In the sixty-eighth Essay we have an examination of the antimoniated silver, from Wolfach, in Suabia; in the sixty-ninth, of crystallized, bright, white *cobalt ore*, from Tunaberg, in Sweden; in the seventieth, the *cobaltic ore of manganese*, from Rengersdorf, in Lusatia.

The seventy-first Essay contains the chemical examination of the native *sulphat of cobalt*, from Herrengrund, in Hungary; and the seventy-second, and last, an examination of the mineral springs at Imnau.

Such are the contents of this interesting volume, which contains no verbose digressions to eke out the pages, as is too common in many of our modern works, but a condensed account of the author's laborious researches. We have not the least hesitation in saying, that this work is a most valuable acquisition to the mineralogical student. The translator hints, that Mr. Klaproth has given him hopes of another collection of Essays, which he promises immediately to render into English. We have only to wish that this may be soon realized.

The translation is, we believe, faithfully executed, but cannot be called elegant; it likewise shews a want of perfect acquaintance with the idiom of the English language; and we would advise the translator in future to submit his translation to the inspection of some friend, who may be capable of pointing out certain little inaccuracies of style, which, though excusable in a foreigner, would be better to have been avoided.

ART. V. *A practical Essay on the Art of recovering suspended Animation: together with a Review of the most proper and effectual Means to be adopted in Cases of imminent Danger.* Translated from the German of CHRISTIAN AUGUSTUS STRUVE, M.D. &c. Duodecimo. 210 pages. MURRAY and HIGHLEY, London. 1801. Price 3*s*. 6*d*.

THE author of this Essay is well known in the medical and philosophical world for various publications, and we give him full

full credit for benevolence and philanthropy, in his endeavours to exhibit to the young medical practitioner, in the present Essay, a rational method of treating persons apparently dead, or exposed to imminent danger. As this is meant to be a compendium of the most successful and approved practice, it cannot so readily admit of analysis, as many of the publications which we lay before our readers; we shall, however, present them with such a general view of it, as seems to us sufficient to give them an idea of the nature, and plan of the work.

The first pages are occupied in a sketch of the history of humane institutions. The ancients, the author observes, had a peculiar veneration for those whose endeavours at resuscitation proved effectual; it was reserved, however, for modern times, to pay that due attention to the subject which its importance deserves. Several productions appeared in the seventeenth century written expressly on the subject; but they did not, at that time, excite general attention or interest, and therefore had little tendency to afford a remedy for the evil which they were intended to correct.

In the year 1767, a society was first formed at Amsterdam for the recovery of drowned persons, which was soon followed by similar establishments in several other towns in Holland; and so successful were those humane exertions in the restoration of life, that to the year 1775, two hundred and eighty-seven, and to the year 1793, nine hundred and ninety persons have been restored to the community.

Directions were published at Venice, and at Hamburgh, so early as the year 1668, for the recovery of the drowned, and premiums promised to those who applied them with success. Proclamations were also published relative to this subject, in various parts of Germany; but, except at Hamburgh and Mohrungera, in East Prussia, the author regrets that there are no institutions for the recovery of persons apparently dead, over the whole German empire. Institutions were formed in several parts of Italy, and in the year 1772 a similar one was instituted at Paris, under the direction of M. Pia.

But the most celebrated, he observes, of any that have yet appeared, is the Royal Humane Society of London, founded in the year 1774 principally by Dr. Cogan and Dr. Hawes, two gentlemen who were not less to be esteemed for their humanity, than their judgment and perseverance. This institution was followed by various others in different parts of the

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island of Great Britain, and in the West Indies and America, from all which much signal advantage has been obtained.

The author next proceeds to give some general observations on humane institutions, which he divides into *preventive institutions*, *preparatory institutions*, *and institutions for saving life*. Speaking of *preparatory institutions*, he suggests, with much propriety, that " no fisherman or waterman ought to be admitted a member of the corporation, unless he be perfectly acquainted with the method of treating the drowned."

On the nature of apparent death, he adopts the opinion of Professor Hufeland, in his work entitled Pathogenia.

" *Vital power is the ability of an organized body to receive impressions, and to exert a reaction.*

" There are two modifications of this *effect* of vital power; viz. *susceptibility of stimulus*, and *irritability*. The former implies the capacity of the organic fibre to be affected by stimuli; it is the result of the vital power, and may exist in the system, though the irritability be not manifested by any external symptoms. *Irritability*, on the contrary, is peculiar to the muscular fibre, which is in a state of reaction, either by the contraction or approximation of its constituent parts, in consequence of any stimulus applied to it, though confined to a particular spot, thus partially affected.

" Upon this theory is founded the idea of apparent death. —*Apparent death is that state, in which the vital power is suspended, or in which there is a want of the susceptibility of stimuli.*" —" It is a state of weak and latent life, from which the person thus affected may recover, if the activity of the vital principle be gradually excited."

The author now gives the following review of all the symptoms of life in their natural order.

" I. *Signs of an existing susceptibility of stimulus.*

" A slight degree of warmth in the region of the heart.

" Contractions and dilatations of the heart.

" A vibrating motion of the whole body, especially after being sprinkled with cold water.

" A convulsive tension of the muscles in some parts of the body.

" II. *Doubtful signs of returning irritability.*

" A slight degree of rigidity in the limbs.

" The skin acquires a gradual smoothness.

" Different parts of it become warm and red.

" Hiccough.

" Contraction

"Contraction and hissing of the nostrils.

"Trembling of the whole body, even without the previous application of stimulants.

"Mucus untinged with blood, issuing from the nose, during the inflation of the lungs.

"A slight convulsive motion of the mouth.

"A firm compression of the teeth.

"III. *More certain signs.*

"Gentle throbbing of th heart.

"Pulsation of the vessels of the heart, and the temporal arteries.

"A slight convulsive motion of the inner corner of the eye.

"A gently undulating motion of the eyeball.

"A slight convulsion of the muscles of the neck.

"IV. *Distinct signs of life.*

"A weak motion of the jaw.

"The lips and face becoming red.

"A contraction of all the muscles of the face.

"Convulsive motions of the toes.

"Sneezing.

"Agitation of the whole body.

"Vomiting.

"Respiration, interrupted by coughing.

"Groaning."

The duration of apparent death depends upon the proportion of vital power in the individual, and the peculiar nature and manner of the accidents. The vital power remains longest latent from cold, but is almost immediately destroyed by lightning. The scale of durability of organic life he thinks may be as follows:

"1. Apparently dead by cold.

"2. Apparently still-born children.

"3. Apparently drowned.

"4. Strangled.

"5. Struck by lightning."

In the records of the London Royal Humane Society there is, he says, only one instance of successful resuscitation in a man who had been three quarters of an hour in the water.

The author enumerates the following as signs of death, viz. cessation of the pulse and of breathing; loss of heat; rigidity; relaxation of the lower jaw; inability of the eyelids to return into their sockets; dimness, faintness, and sinking of the cornea; foam in the mouth; blue spots over the body; a cada-

verous

verous smell; insensibility to stimulants. All these, however, he is of opinion, are uncertain. The only indubitable one is putrefaction; but as this is some time in occurring, he thinks we may generally be able to ascertain whether death has actually taken place, by comparing the various circumstances enumerated, with the history of the accident and the attempts at resuscitation. Animal electricity, he is disposed to consider as a test of the existence of vitality, and recommends it, when used, to be applied by means of an incision in the arm.

Our author next gives us the external signs of apparent death by drowning, suffocation by the cord, cold, mephitic vapours, lightning, and in still-born infants; and goes on to mention the general principles of resuscitation to be pursued in persons apparently dead.

He gives the particular treatment in the various cases of apparent death in the form of tables for convenient reference; but as the principles and practice are so well known, from the publications of the Royal Humane Society, it is unnecessary to be diffuse upon the subject.

The following are the practical rules which he gives for the treatment of persons apparently dead, or endangered:

"1. Crowds should be guarded against, as five or six persons are sufficient to perform the process, and a few others may procure the necessary instruments.

"2. The person endangered should not be brought into a warm or crowded room.

"3. A free circulation of air must be obtained, by opening the windows of the room where the process is conducted.

"4. A hasty application of resuscitatives is dangerous, and tends to extinguish the vital principle.

"5. All resuscitative remedies, when too strong, and abundantly administered, are prejudicial.

"6. Proper means of exciting susceptibility ought to be applied from the commencement, and continued throughout the whole process of resuscitation.

"7. Stimulants should be administered only in proportion to the perceptible degree of susceptibility.

"8. All resuscitatives are to be gradually applied, according to the temperature of the body.

"9. A single remedy should never be considered as sufficient to restore animation, but a proper and successive application of several should be pursued.

"10. Before the patient has recovered the power of deglutition, neither medicine nor nutriment ought to be administered.

tered. Emetics, in particular, might prove fatal at this period.

"11. Clysters of tobacco, emetics, and sternutatories, ought to be used with great caution, or not at all; they are particularly dangerous at the commencement of the process.

"12. All powerful odours are prejudicial, especially during the first indications of life.

"13. The process should be continued from *four* to *six* hours; nor should the recovery of the patient be despaired of, till the most unequivocal signs of death have become evident."

His recapitulation of the different resuscitative remedies in *suffocation in water*, we shall give as a specimen of his arrangement and practice.

"*First Treatment.*

"1. The subject should be gently taken out of the water by the arms, to prevent the head and breast from being injured.

"2. The body ought to be carefully carried into the nearest house, with the head somewhat raised; or the resuscitative process may be performed in the open air.

"3. The upper part of the body must be supported in an erect position, with the head inclining towards the right side, and the whole body should be placed in such a manner, as to admit of free access.

"4. The clothes are to be taken off without delay; and no violent shaking of the body should be attempted.

"5. The mouth and nose are to be cleansed from mucus, by a feather dipped in oil.

"*Warmth.*

"1. The subject must be covered with blankets, or featherbeds, hay, straw, &c.

"2. If it be a child, a person may lie beside it in the bed, to promote warmth.

"3. A tepid bath should be applied, the warmth of which ought to be supported.

"4. The warmth of the bath ought to be moderate in the beginning; and gradually increased to the 70th degree of Fahrenheit's thermometer.

"5. Different parts of the body, particularly the pit of the stomach, ought to be warmed by the application of a bladder filled with tepid water, or by aromatic fomentations, or a warming-pan wrapped in flannel, and gently moved along the spine.

"*Stimulants.*

"*Stimulants.*

"1. Friction, applied gently at the beginning, and gradually increased, especially when the motion of the heart is perceptible. This operation is performed with warm flannel, or brushes dipped in oil.

"2. Stimulating clysters of warm water and common salt; aromatic plants; or a strong solution of tartar emetic.

"3. Clysters consisting of five or six ounces of brandy.

"4. Sprinkling with cold water.

"5. The cold shower-bath, or aspersion of the pit of the stomach, with a syringe.—N. B. After each application of the shower-bath, the body ought to be wiped dry, and the pit of the stomach gently chafed.

"6. Electricity.

"7. Whipping with nettles.

"*Remedies to be applied on the Appearance of Life.*

"1. Moderate continuation of the resuscitative method before mentioned.

"2. Rest.

"3. After the return of deglutition, tea with vinegar may be administered.

"4. Vomiting should be excited, by a decoction of chamomile, with honey of squills, or by the application of a feather dipped in oil.

"5. The patient must be treated with as much caution as one dangerously wounded, or even as a lying-in woman.

"*Resuscitatives, only to be applied in Cases of Extremity.*

"1. Introduction of air to the lungs.

"2. Venesection.

"3. Vomiting.

"4. The hot shower-bath.

"N. B. Persons drowned in the winter season, should be treated in the beginning of the process, as if they had suffered by intense cold."

Concerning inflation of the lungs, our author observes, that "this operation seems, in general, to be prejudicial; and, as it is attended with great difficulty, it can scarcely ever be recommended to persons who are not of the faculty. If performed alone, without warming, moderate friction, &c. it will prove rather injurious to the subject; and without hesitation, I subscribe to what Professor Vogel, of Rostock, wrote to me on this subject. 'I, for my part,' says he, 'expect 'very little success from the introduction of air into the lungs; 'and

'and I am of opinion, that, by the general method of proceed-'ing, little or no air will reach this organ; and even if it does, I 'never could perceive the least expiration of it, nor any motion 'of the chest.'

"Unless the tube can be introduced into the glottis, not even an expansion of the lungs will be produced, as the epiglottis prevents its entrance. Air which has already been breathed, is consequently unfit for respiration; while, on the other hand, the use of the bellows may prove dangerous, by the violence of their exertion on the lungs.

"The common practice of continuing this operation too long, is also dangerous. I know a case of a person apparently drowned, in whom the signs of returning life were perceptible, but whose recovery was prevented by the abuse of this stimulant.

"If any benefit can be expected from this remedy, it is by its stimulating effect, which has, sometimes, proved beneficial to still-born children. Professor Osiander is of opinion. that by this process the mucous matter which covers the lungs, is, in some degree, dispelled, and a passage cleared for the admission of air."

To his opinions on this particular we cannot subscribe: the difficulty of inflating the lungs is by no means considerable, and the advantages derived from it are admitted by many authors of much experience, to be very great; it also appears to us, independent of its success, to be a practice founded upon the most rational principles.

The last section of this work, is on the manner of saving persons in extreme danger, and is intended as a remembrancer to the medical practitioner. This includes the different methods of treating persons endangered by accidents; a table of accidents, and their remedies; an examination of poisons; the treatment and prevention of hydrophobia, apoplexy, &c.; and a table of the different operative means of resuscitation.

ART. VI. *The Family Physician; or, Domestic medical Friend; containing plain and practical Instructions for the Prevention and Cure of Diseases, according to the newest Improvements and Discoveries; with a Series of Chapters on collateral Subjects; comprising every Thing relative to the Theory and Principles of the medical Art, necessary to be known by the private Practitioner. The Whole adapted to the Use of those Heads of Fami- who have not had a classical or medical Education.* By ALEX. THOMSON, M.D. Author of a Treatise on nervous Disorders; of Dialogues in a Library; and other Productions. Duodecimo. 573 pages. PHILLIPS, London. 1801. Price 6*s*.

THE preservation of health is so intimately connected with human happiness, that an interest and importance attach to all the means of promoting it. The success of empirics, so disgraceful to a cultivated age, has its basis on this principle; and to counteract their ill-founded and insolent pretensions, we are convinced that no means can be so efficacious, as those which tend to enlighten and inform the public mind. The present work seems to us to be conducive to this end, by comprising much useful information respecting the preservation of health and the cure of diseases, and by containing plain and perspicuous directions for preserving and preparing remedies from the produce of our own soil, many of which are not less efficacious than some of the expensive productions of foreign climes. To families, particularly those resident in the country, such a publication will be a useful acquisition.

The *first* book, of about eighty pages, contains an account of the structure and functions of the several parts of the human body; an account of the non-naturals, clothing, and the means conducive to long life.

The *second* delivers the detail and treatment of the diseases of infants and young children; in which is included a clear account of the vaccine inoculation.

The *third* treats of fevers; and the *fourth*, which might have been divided into two or three books, contains inflammations, and all the chronic diseases; together with the treatment of poisons, accidents, suspended animation, &c.

Then follows a treatise on surgery and its operations; the means of preserving the health of soldiers and sailors; directions for the use of baths, and an account of the mineral

 waters

waters of this island. The work is concluded by an appendix, on the preparation and doses of medicines. There is also a proper glossary to explain such technical terms as were unavoidable, and an index of diseases and remedies.

In the execution of this extensive plan, Dr. T. has adopted a plain, perspicuous style, as free from technicality as could be expected. He has steered clearer of hypothetical notions than most writers; though we sometimes perceive a remnant of the humoural pathology.

As a specimen of our author's style and manner, we shall transcribe the twenty-first chapter of the fourth book, which treats of the Hysteric Disease.

"This disease affects women of a great sensibility of constitution, and who are frequently liable to obstructions of the natural discharge. It is of all disorders the most various in its appearance; and generally comes on between the age of puberty and thirty-five. It also more frequently seizes barren women, and young widows, than such as are bearing children.

"*Symptoms.*—The disorder commonly begins with a languor and debility of the whole body; yawning, stretching, and restlessness. A sense of coldness in the extremities almost always precedes, and for the most part continues during the whole of the hysteric fit. Sometimes, however, this is alternated with a sense of heat in different parts of the body. The colour of the face is variable, being sometimes flushed, and sometimes pale. There is a violent pain in the head; the eyes become dim, and pour out tears. There is a rumbling and inflation of the intestines. A sensation is sometimes felt like that of a globe ascending from the lower part of the belly, and which rolls along the whole alimentary canal. It ascends to the stomach, sometimes suddenly, sometimes slowly; and there produces a sense of weight and anxiety, nausea, and vomiting. At last it comes up to the throat, where it produces a sense of suffocation, and difficulty of breathing or swallowing. During this time, violent pains are felt, both in the external and internal parts of the abdomen, accompanied with convulsive motions of the muscles. Sometimes the fit ceases after these symptoms have continued for a certain time; but more frequently the patient falls into a fainting fit. Sometimes she lies quite motionless, as if in a profound sleep; sometimes she beats her breasts violently with her hands. At other times, she is seized with general convulsions, and the disease assumes the

the appearance of an epilepsy. In some patients, a violent beating pain takes places in some part of the head, as if a nail was driving into it, and all objects seem to the person to turn round. Sharp pains, likewise, attack the loins, back, and bladder, and the patient makes an extraordinary quantity of urine as limpid as water; which is one of the most characteristic signs of the disease. The mind, as well as the body, is greatly affected. Sometimes the person is tormented with vain apprehensions; sometimes she will laugh, at other times cry immoderately.

"The appearances which take place in this affection are, indeed, so various, that they cannot be enumerated; but all the symptoms of the disease seldom concur in the same person: for they vary extremely in every circumstance. When the fit remits, the pulse becomes more strong; the heat returns to the extreme parts; a rumbling noise arises in the belly; and at last, as if awaking from a profound sleep, the patient regains her voice, sense, and motion; but complains of a heavy pain of the head, and a general weakness.

"*Cure.*—During a violent hysteric fit, if the patient be of a sanguine constitution, some bleeding may be of service; but otherwise, especially in delicate habits, this operation is not advisable. Fœtid volatiles, singed feathers, and the like, may be applied to the nostrils; and cold water, and fœtid volatiles, administered internally, if the patient can swallow. Cold water may also be sprinkled on the face aad breast. Cool fresh air should be admitted into the apartment, and the patient's feet and legs be placed in warm water. Friction of the lower extremities is also useful. Particular attention should be paid to the state of the monthly evacuation. If deficient, it ought to be promoted; and if too copious, should be restrained, as will afterwards be directed in the treatment of these complaints. If the patient be costive, it will be proper to give a laxative clyster with milk of asafœtida.

"For the radical cure of the hysteric disorder, recourse must be had to those means which strengthen the nervous system, the chief of which are chalybeate medicines, or the preparations of iron, the Peruvian bark, and the cold-bath. But medicines which allay irritation are likewise advisable occasionally. Take of the tincture of asafœtida, and of castor, each two drachms; compound spirit of lavender, four drachms. Mix and preserve them for use. A tea-spoonful of this mixture may be taken, in a little water, upon the approach

proach of any languor; and when the person feels herself under any agitation, ten or twelve drops of laudanum may be added to a dose of it. On such emergencies, likewise, as well as during a fit, the application of the anti-hysteric plaster to the belly will be found of great advantage.

"An attention to diet is highly proper for the removal of this disorder. Milk, where it agrees with the stomach, has frequently good effects; but, otherwise, the diet should consist of light animal food. In general, malt-liquors, as being flatulent, are not advisable; except good porter. The best drink is water, with the addition of red wine, if it agrees with the patient; but if not, a small quantity of spirits. If the patient cannot comply with a total interdiction of tea, she ought to use it sparingly. Exercise, particularly riding on horseback, is of great service; as are, likewise, amusements and cheerful company."

ART. VII. *Medical and physical Memoirs; containing, among other Subjects, a particular Inquiry into the Origin and Nature of the late pestilential Epidemics of the United States.* By CHARLES CALDWELL, M.D. Octavo. 348 pages. BRADFORDS, Philadelphia. 1801.

HOWEVER much the yellow fever has been an object of discussion, both with the medical men of this country, and among those, who, by their local situation, are more particularly interested in it, opinions are still divided, not only on the treatment, but even on the origin of the complaint. While some confidently trace it to a foreign source, others, with no less conviction, see it plainly to be of domestic origin, and kept up by a certain diseased constitution of the air.

The question, though important and interesting, does not seem to affect the means which ought to be employed in the cure of the disease; nor can the determination of it, in whatever way it may be, at all do away the necessity of attending to cleanliness, ventilation, and the removal of any of those sources by which contagion is either generated, or its progress particularly favoured. The advocates for the domestic origin of the yellow fever, upon their own principles, should remove the sources from which they suppose the disease to have originated. It is no less incumbent, on the other hand, on those who favour the idea of its being imported, to adopt the proper means for stopping the progress of contagion, which must not only tend

more

more speedily to remove it, but also diminish the force of its ravages, when again unfortunately introduced.

We should therefore be happy to see both parties uniting their endeavours to stop the course, or prevent the recurrence of a serious malady, and lay aside that disposition to controversy, which makes them frequently lose sight of that great object which should be always kept in view.

The author of the present Memoirs, is one of those who are convinced, that the yellow fever of Philadelphia originated in a domestic source, and was favoured by a particular constitution of the air.

The first Memoir is an introduction to the second, and contains a physical sketch of the city of Philadelphia, interspersed with general remarks, applicable to all large and populous cities.

Our knowledge of the origin of pestilential diseases, he thinks, must depend on our being acquainted with the peculiar constitution of the air, and the topography of the places in which they occur. He laments, that so little has been done on the latter subject, though within the sphere of observation; and, in order to supply the want with regard to Philadelphia, he gives several observations on the climate, situation, population, and other particulars relating to it.

The *climate* of Philadelphia is subject to sudden vicissitudes of heat and cold, and a range of the thermometer from 6° to 95°. It has a factitious temperature of its own, and is always in summer from 4° to 6° warmer than the country; in winter the temperature is nearly equal. The changes from the cold of winter and spring, to the warmth of summer, produce alterations in the constitution of the inhabitants of Philadelphia, similar to those which Europeans suffer in going from Europe to the West Indies. The temperature in this and other great towns, he considers as arising from various sources: such as the numerous fire-places; fermentation; animal respiration and perspiration; the impeded circulation of air; the small evaporation from the streets; and the numerous "solid and opake substances in large cities, that act on the principle of reverberating furnaces, by intercepting and reflecting the rays of the summer sun."

With regard to *situation*, Philadelphia is considerably above the level of the sea, and its distance from mountains, as well as the ocean, prevents it from being refreshed by sea or land breezes. Its wells are of the temperature of from 50° to 53°; and vegetables are often found in entire preservation, at a great

great distance from the surface of the earth. It has been more subject to bilious fever since a forest was cut down in the year 1778 between Philadelphia and the marshes. In this memoir we find the following florid description of the changes which Philadelphia has undergone in less than a century.

" On the ground, where the private dwelling, or the public edifice, now rises in the majesty of art, I behold, in imagination, the cabin of the savage! On the very spot immortalized by that band of patriots, whose wisdom planned, and whose intrepidity declared the independence of our country, I see the Sachems assembled deliberating on blood! On yonder stream, where now the vessel towers in her pride, armed with the thunders of a mighty people, or richly fraught from the climates of the East, I behold the untutored Indian embarking in his canoe, to angle for the precarious subsistence of a day! And, hark! to the ear of fancy, that harbinger of death the war-whoop, resounds from the place where the eloquence of our nation is heard! Such has been the triumph of industry directed by wisdom, and urged by a spirit of enterprise, over the rudeness of uncultivated nature!"

The population he states to be about seventy-five thousand. The mode of living, he thinks, is too luxurious to be healthy. Fannel is not sufficiently worn. The walls of the houses are too thin, the windows too numerous; and the streets too broad; for ventilation, he thinks, will be as perfect in an avenue of twenty as one hundred feet in breadth, and people will in such a street be exposed neither to so much cold, nor so much heat. The latter observation seems to us to be contradicted by the experience of large towns, and is indeed in opposition to a remark of his own, that " a less free circulation of air in the city than in the country atmosphere, by allowing the warmth of our own bodies, as well as that produced by adjacent objects, to be accumulated round, and to remain in contact with us, proves a very fruitful source of the distress we experience from the summer temperature of the city."

Graves, he, with much propriety, thinks should be out of a city.

In the second Memoir, consisting of several numbers, which first appeared in one of the public prints of the city in 1799, the author endeavours to prove,

" I. That the late epidemic of Philadelphia, and other parts of the United States, was not a contagious disease.

" II. That consequently it was not an imported disease.

"III. That it was only a modification or higher grade of the common bilious fever of the country.

"IV. That it was essentially different from the typhus mitior, or jail fever."

It was not till the year 1797, that the author was convinced of the yellow fever not being contagious or imported; and since that period, every circumstance which has occurred on the subject, has served to confirm the idea now entertained by him. He says, that, fortunately for the opposite party, till the epidemic of 1799, some fact or other could always be adduced, which gave a colouring to their doctrine; but at that time, as no such facts could be discovered, they were obliged to rest upon the evidence of former years, to help them out in the idea, that the epidemic of 1799 must also by analogy have been imported.

We think the author, in too many parts of his work, taxes his opponents with prejudice, weakness, and want of candour; and are of opinion, that, in order to avoid the danger of a retort, he ought certainly to have noticed here the evidence on this subject, whether conclusive or not, adduced by Dr. Curry, in his Sketch of the Rise and Progress of the Yellow Fever of 1799 *, which shews, that the favourers of importation did not rest altogether upon the evidence to which he states them to have confined themselves. Though we are not convinced that the arguments are conclusive which were adduced to prove the epidemic of former years to have been imported, yet we conceive that to those who thought it so, it afforded a strong presumption for the similar origin of a similar complaint occurring afterwards.

The author expresses his disbelief, that any vessels were suffered in the year 1799 to pass the lazaretto in a foul, sickly, or infected state; yet he does not deny that they have become sources of disease, after their entrance into the port of Philadelphia; and he adduces an instance to this effect; but thinks, that the operation of this cause would have only extended to the production of a few sporadic cases, and could not have produced any general effect, except through the medium of a pestilential constitution of the air. He is of opinion too, that, as a fever was produced in the ship alluded to, from coffee pent up and putrefying in the hold, a similar effect could be produced by putrefying filth elsewhere; and considers his

* Noticed in London Medical Review, vol. vi. p. 60.

opinion

opinion confirmed by determination of the Board of Health, which was composed of independent, thinking men.

Were the fever imported and propagated, he continues, "by a cause, so permanent and indestructible as that of specific contagion, it would, like the small-pox and measles, bid defiance to the air of every situation, and to every possible vicissitude of our seasons. It would not, as is now the case, limit its terms of existence, exclusively, to those months, during which the atmosphere is impregnated with putrid exhalations; nor would it confine its ravages to places abounding with vegetable and animal filth. Like other truly contagious diseases, it would shew itself in every situation, and in every season.

"The progress of yellow fever through a city or country, is by far too rapid to depend entirely on the powers of contagion. We will select, in this instance, as a standard of comparison, the small-pox, acknowledged to be, of all diseases, the most uniformly and certainly contagious. How slow, and almost imperceptible is the spread of this disease, compared to that of yellow fever? It is known that the latter will, in two or three weeks, overrun an extent of city, which the former will not pervade in twice as many months.

"To what cause can such a remarkable difference be owing? —Certainly to this, that the small-pox is propagated, only, by contagion, from the sick to the well, a source of disease which most persons have it in their power to avoid; while yellow fever is spread by a vitiated, or, what I shall here term, a malignant atmosphere, which, being a common medium, has access to every one.

"The progress of the small-pox, when not epidemic, can be arrested, by an entire interdiction of intercourse between the sick and the well. But the case is different with regard to the yellow fever. The seeds of this disease hover unseen, in the atmosphere at large, and attack us with as much certainty in the streets, as in the sick-rooms of our friends."

It may be observed here, however, that though it is admitted, that a certain unknown constitution of the air is necessary to favour the spreading of contagious diseases, yet this is not conclusive against the foreign origin of the yellow fever.

The malignant fevers of Europe are always contagious, but it is only at particular periods that they become epidemic; it is not, therefore, unphilosophical to suppose, that a fever might be brought from one place to another, at which its progress might be favoured by a particular state of the atmosphere; since it

is admitted, that this state of the atmosphere is not alone sufficient to produce disease, and that without it a few sporadic cases only would appear.

"From the occurrence," says our author, "of this malignant constitution, aided by an accumulation of their own domestic filth, most of the large and populous cities of Europe have experienced occasional visitations of pestilence. I may instance, in particular, Rome, London, Paris, Marseilles, Amsterdam, Lisbon, Madrid, and Moscow. In consequence, however, of a favourable change in the atmospheres of these places, and their adoption of wise and salutary regulations for the promotion of cleanliness, they have been exempt from this calamity for nearly a century."

It must not be forgotten, however, that as the quarantine laws are always rigorously enforced, some effect must be owing to this circumstance in preventing the introduction of pestilence.

The following the author enumerates as the sources of pestilential effluvia in Philadelphia: the docks and wharfs; the foul air of ships; dirty yards, cellars, &c.; the common sewers; the gutters and alleys; the collections of filth in the neighbourhood of the city; the public burying-grounds; the covering the houses with shingles; the stables, shambles, and slaughter-houses; the undue crowding the inhabitants of the city.

He recommends several methods for assimilating the atmosphere of the city as much as possible to that of the country, such as planting trees in squares, streets, and public walks; the cultivation of gardens and grass-plots, and converting the gutters into rills of wholesome water. He advises the inhabitants of the city, as the means of freeing them, in some measure, from the danger of the attacks of yellow fever, to make more use of vegetable food, and frequently to employ the cold bath.

The reason why the filth of Philadelphia produces yellow fever now, and not in former years, he thinks, is owing to a combination of circumstances: 1st, the pestilential constitution of the atmosphere, evidenced by the uncommon disease and mortality among domestic animals, and the late violence and obstinacy of febrile diseases both in town and country; 2d, the state of the streets as being favourable to the production of fatal exhalations, by being neither so wet as to admit of the effluvia being absorbed by the water, not so dry as to prevent exhalation altogether; 3d, the grave-yards, sewers, and other

 sources

sources of putrefaction being now completely saturated with putrid effluvia.

The reason which he assigns for the fever generally first appearing near wharfs, is, that there is more filth there than in other parts of the city; and the country, he thinks, is less liable to have the yellow fever generated in it, from there being fewer sources of putrid exhalation than in towns, to give rise to an epidemic constitution of the air. The author answers the assertion of those who allege, that the " yellow fever has never occurred in the United States, except when unusually prevalent in the West India islands," by saying, that, were the fact even true, which he is inclined to doubt, it is not improbable, that the same epidemic constitution of atmosphere may extend from the West Indies to America. If this, however, were allowed, it would weaken the reason by which the author accounts for the yellow fever not appearing in the country round Philadelphia; for if the vitiated state of the atmosphere could be supposed to extend from the West Indies to America, it could not be imagined to confine itself to the bounds of a city.

The author gives a summary of his objections against the contagious nature and importability of yellow fever, in the 8th number of this memoir: the principal ones are, that a similar belief is entertained by respectable practitioners in the West Indies; that a vitiated constitution of the air is necessary for its propagation; that in the cleanly parts of Philadelphia the disease is not contagious; that it is extinguished by a slight frost; that it has not, like other contagious diseases, a specific character nor definite period. He sums up his reasons for believing it of domestic origin, by stating, that, as it is not contagious, its importation is impracticable; that it was not introduced from the West Indies to America between the years 1762 and 1793, notwithstanding the want of quarantine regulations; that it was never introduced into Britain or France by West India vessels; that the attempts to establish the importation of the disease have always been unsatisfactory; that it is the constant product of putrefaction in other warm climates; that it never exists in America, except when the atmosphere is loaded with putrid exhalations; that a genuine yellow fever existed among the aborigines of the country; and that the belief of the author is adopted by the most distinguished medical characters of the United States.

The ninth number is occupied by an examination of, and objections

jections to, Dr. Chisholm's account of the importation from Bulama of a contagious fever in 1793, by the ship Hankey.

The author alleges that Dr. Chisholm is the only physician of eminence who adopted this idea.

That the history of the Hankey previous to her arrival in Grenada, renders it improbable, that she could have introduced contagious disease into that island; her passage between Bulama and Grenada was nearly three months, and, during this time, she had been twice carefully cleaned and purified, once at Biasso, and again at St. Jago, after symptoms of disease had disappeared among the crew. At the latter place, she kept up a communication between two British ships of war, and in her way from thence to Grenada, lay some time at Barbadoes and St. Vincent's, without disseminating any complaint.

That soon after the appearance of the yellow fever in Grenada, other diseases disappeared, as is usual where any complaint is produced by a vitiated state of the atmosphere.

That it attacked those more readily, who arrived recently from the north, than the inhabitants of the island; and that the negroes enjoyed a particular exemption from it.

In the tenth number the author presents us with a statement of the analogies between bilious and yellow fever, and the most successful mode of practice in the latter complaint; concluding with a statement of the differences between that disease and typhus mitior.

"I. The common and the yellow fever of our country, appear and disappear, at the same seasons of the year.

"II. They appear only in situations of the same description, being confined exclusively to such as abound, more or less, in putrid exhalations.

"III. The bilious and the yellow states of fever select their subjects, for the most part, from among persons of the same description.

"IV. They are ushered in, in the same manner; they exhibit, during their course, symptoms differing only in degree; and commit their principal ravages on the same organs and parts of the body.

"V. They oftentimes give rise to the same forms of chronic disease.

"VI. These states of fever may be reciprocally converted into each other.

"VII. The common bilious and yellow states of fever are alike destitute of the power of contagion.

"VIII. The progress of both these forms of disease has been,

been, at times, arrested by a continuance of very dry and warm weather.

"IX. These states of fever frequently prevail in the same place, at the same time, and, therefore, under the same constitution of atmosphere.

"X. The same mode of practice, urged with different degrees of energy, and to different degrees of extent, is found to be alike efficacious in their cure."

On the differences between typhus mitior and yellow fever, he observes,

"1. That typhus mitior is acknowledged, by every one, to be unequivocally contagious.

"2. That it is a disease of temperate and cold climates, and prevails indiscriminately at all seasons, but commits its greatest ravages during the winter. Regions bordering on the line appear to be altogether inimical to its existence."

3. That, contrary to yellow fever, the typhus attacks "the weakly, and such as suffer from a deficiency of nourishment."

"4. That it seldom, if ever, spreads as an epidemic."

"5. That its attacks are slow and gradual; not, as in yellow fever, rapid and impetuous."

6. That its early attacks bear ill with evacuations.

7. That it has "no hour of respite," like yellow fever.

8. That from dissection it appears, that yellow fever principally affects the abdominal viscera, while the ravages of typhus are mostly confined to the brain.

The author states the domestic origin of yellow fever not to be a new idea, but one which was entertained by Drs. Dickinson and Bond on the epidemic which prevailed at Philadelphia in 1762.

On the treatment of this disease the author gives but a few observations.

"Yellow fever," says he, "though not in every instance a disease of excessive action, appears to be always produced and continued by an excess of stimulus. Hence, in its early stages, the mode of treatment consists in the use of sedative or evacuant remedies," except when the "powers of life have been paralyzed by the first impressions."

"In yellow fever, as in all other febrile diseases, the morbid excitement is both general and local. It is general, as diffused throughout the whole vascular system; it is local, as determined, more particularly, to the stomach and other abdominal viscera.

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"In the stomach, a degree of morbid excitement running on to inflammation occurs, which may perhaps be considered as the radix of the disease. It appears to be the first link in the chain of phenomena, which constitute, collectively, the malady in question. The other links most probably grow out of this, on the all-pervading principles of sympathy."

"Corresponding to the symptoms they are intended to combat, the remedies for yellow fever must be both general and local.

"The general remedies are, rest, silence, a recumbent posture, cool air, or affusions of cold water, sudorifics, and blood-letting.

"The local remedies are cathartics, enemas, cool drinks, and whatever has a tendency to diminish immediately the excessive action in the blood-vessels of the stomach and its appendages. Though these exert also an influence on the general excitement, they do it only through the medium of sympathy. They affect, in the first instance, the stomach and intestines, while these organs, by their extensive range of sympathy, produce similar effects on the other parts of the body."

These are the remedies indicated in that stage of fever "where excessive action constitutes the predominant feature." Others are necessary "after the febrile symptoms have been sufficiently moderated by the operation of those already mentioned." These are "the hot and the cold bath, sometimes alternated with each other, sinapisms, blisters, and mercury, pushed to the extent of salivation."

The last memoir consists of strictures on Dr. Barton's ideas on the disease of goitre, as it prevails in different parts of America. Dr. Barton considers the remote cause of goitre as the same miasm which produced intermittent and remittent fevers and dysenteries. His arguments are, that glandular affections are not unfrequent in intermittent countries, and may therefore arise from a common cause; that in most places in Europe and America where goitre prevails, remittent and intermittent fevers are observed; that the colour of goitrous persons is generally a yellowish brown; and that goitre seems to preserve from intermittents. To these the author answers, that glandular affections are not more frequent in intermittent than other countries; and that in these the viscera, not the glands, are generally affected by disease; that intermittents appear in every country, while goitre is confined to a few; that the colour

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may be accounted for in various ways; that phthisis, scrofula, wens, buboes, gleets, psora, &c. have the same effect as that ascribed to goitre, of preserving from intermittents.

The author adduces a few other arguments against Dr. Barton's hypothesis. Where bilious fever is most common, goitre, he asserts, does not exist; goitre, contrary to bilious fever, attacks more women than men; it is not more troublesome in summer and autumn than at other times of the year; it does not alternate with bilious fever; it is often accompanied by an approach of fatuity; it is not checked by any seasons or periods; marsh masma is never known to produce a chronic and general affection, (except perhaps in the hepatitis of the East,) unless as the result of preceding general fever.

The work concludes with an address delivered by the author to the gentlemen of the Philadelphia Medical Society, on the analogies between the yellow fever and the true plague, which he thinks particularly strong. He is of opinion, that true plague is, with yellow fever, free from contagion, and dependent upon a vitiated state of the atmosphere.

From the analysis we have given of the reasoning which the author has employed in support of the principal object which he had in view in the publication of these Memoirs, it will be readily seen that his arguments are of very unequal force; and that he sometimes adduces, in favour of a particular point, a circumstance as much in dispute as that for which he contends. Thus, when he states, as at page 166, that the importation of yellow fever is impracticable, because it is not a contagious disease, he employs an argument to which his adversaries will not be inclined to allow any force, since they equally contend for its contagious nature as its importability.

It may be observed, that the author makes a considerable error in nosology, when he mentions the typhus mitior of Dr. Cullen as being better known by the names of jail, hospital, and ship fever. He will find that the jail and ship fevers of Huxham, and the hospital and jail fevers of Sir John Pringle, are all included under the *typhus gravior* of Cullen, not the typhus mitior.

Elegance of language is certainly what we do not expect in philosophical writing; the public are, however, entitled to accuracy; and we should not consider ourselves as performing our duty were we to neglect expressing our disapprobation of such expressions as the following, which occur in several parts of this work, viz. "Diseases communicable from the sick to the *well*;" "the *spread* of diseases;" "communications too *lengthy*;"

lengthy;" "intermittents *illy* cured," &c. We may add too, that though the author has brought forward very forcible arguments in favour of the opinion he adopts, we cannot approve of that disposition to his opponents which many of his remarks seem to discover.

Art. VIII. *An Essay on the proximate Cause of animal Impregnation*; *being the Substance of a Paper read and discussed in the Medical Society at Guy's Hospital, in October* 1799. By John Pulley, of Bedford, Member of the Royal College of Surgeons in London. Quarto. 31 pages. Cox, London. 1801. Price 2*s*.

IN the Essay before us, the author says it is his sole intention to prove, by argument and fact, the inefficacy of the doctrines taught by Darwin, Haighton, and all those who exclusively give the power of reproduction to one sex. Before entering particularly on this object, he has considered it necessary to inquire, whether the existence of a corpus luteum is to be regarded as a test of impregnation? The author believes it is not; and he asserts, on the authority of Blumenbach and Saumarez, that the excitation of the uterine system, by unnatural means in unmarried girls, will occasion its formation. He has also considered the membrane, which Dr. Denman has described as being expelled from the uterus in painful menstruation, as arising from the same cause; and he asks, whether corpora lutea would not be found in the ovaria in all such cases.

Mr. Pulley also wishes to know from Dr. Haighton, whose doctrine of generation particularly rests on this point, how it was, in all his experiments, wherein he divided the fallopian tubes, and yet the evolution of the ova took place; that in no one instance those ova went on in evolution producing extra-uterine fœtuses: and he concludes, that the Doctor's experiments, as hitherto made, prove only that the sexual act is capable of extricating the ovum or vesicle from its ovarian habitation.

As another argument to prove the same thing, the author has brought forward the fact, that after coition more corpora lutea will sometimes be found than fœtuses, without any violence having been offered to the female.

Having thus concluded that the existence of corpora lutea does not constitute a criterion of impregnation, the author proceeds to the subject of generation. He takes an opportunity of laughing at the imaginations of Leeuwenhoek, whose

 hypothesis

hypothesis on this subject he considers as a cock and bull story.

He then enters on Darwin's theory, which he treats with very little delicacy or respect, considering it as worthy of the flighty wildness of a poetical fancy, but ridiculous when introduced into philosophy.

Dr. Haighton's opinion next falls under notice; and on this we shall give the author's observation, in order that our readers may have an example of the manner in which this Essay is executed.

"I now come to that system of generation which places the female in the power of propagating without the material interference of male semen. This theory, like the former, had its advocates in former times, and still finds men willing to defend it. A celebrated physiologist of this day (Dr. Haighton) informs us, 'that the semen first stimulates the 'vagina, os uteri, cavity of the uterus, or all of them;' and that *by sympathy* the ovarian vesicles are perfected, (then containing the rudiments of the fœtus,) and the rudiments of the fœtus are conveyed by the fallopian tubes into the uterus, where the necessary preparations are made for perfecting their formation and growth. By this theorist it is concluded that the contact of the male semen with a vesicle of an ovary is not necessary to effect impregnation; and on the following circumstances he rests his conclusion. Because, (let it be observed that this author regards the existence of a corpus luteum as the test of impregnation having been effected) on the division of one of the fallopian tubes before coition, the corresponding ovary, after the sexual act, bears *the marks of impregnation:* because the fimbriated extremity of the fallopian tube does not embrace the ovary before *the evidence* of impregnation is present; and because, admitting that the tube has previously come into contact with the ovary, on dividing it, corpora lutea are found, but no fœtuses. The above is the groundwork of the theory in question.

"Let it be admitted that the sexual act can effect the perfection of the ovarian vesicle, and, in consequence, the formation of a corpus luteum; but I deny that impregnation can be effected without the contact of the male semen. But it is asked, how can the semen be brought into contact with the ovary, seeing that the fimbriated extremity of the fallopian tube does not embrace it during coition, or for many succeeding hours? By way of answer, I ask, what proof have we that the tube, at the very time of connexion, does not embrace

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the ovary? What argues it that it was found in its usual situation a few minutes after coition? Does this deny the possibility of the contact during the sexual act? But physiologists, concerning the actions of the tube, are not very coincident in the relation of their experiments. One tells us (as the author of the theory now under consideration) that in a train of observations on different rabbits, he never found the fimbriæ from the first to the ninth hour post coitum embracing the ovary; another (Mr. Saumarcz) assures us, that in repeated experiments he has seen the fimbriæ effect this important work in not more than two hours and a half after coition; and a third (the late Mr. Cruickshank) asserts that he has found the tube tightly embracing the ovary in a rabbit highly disposed to receive the male, but which had not been permitted to copulate.

"The actions of the tube I shall reconsider hereafter; and now go on with the theory at this time under observation.

"Allowing time for the tube to embrace the ovary, Dr. Haighton then divided it, and on a subsequent examination found corpora lutea in the corresponding ovary, but no fœtuses; but on dividing the tube after the ova had been deposited in the uterus, and, after a proper time examining, fœtuses were found to exist.

"Previous to the dislodgment of the vesicles from the ovary, there is no wonder that the division of the tube should arrest the operations of nature; for dividing the tubes prior to the sexual act produces such derangement in the system, as even to destroy the venereal appetite; and this not unfrequently by the simple division of one tube. But after the deposition of the ova in the uterus, there is no reason to suspect that the like violence should produce the like effect; for the rudiments of the fœtus have then attained their destined place for their proper evolution and perfection; and the uterus is prepared for their reception; consequently we should not then expect nature easily to be interrupted.

"Now it is necessary to know what air of probability there is for supposing that reproduction can be effected without the material assistance of male semen. Analogy teaches us the utter impossibility of it. The semen must essentially communicate with the ovary, or with what passes from it. If impregnation be not effected by the semen of the male being brought in actual contact with the ovum or ova of the female; why is this fluid cast on the ova of the female frog?

frog? for what purpose is it discharged? The male has no external generative apparatus by which to introduce the semen, consequently no stimulus can be given to any part of the procreative system of the female. The author who generates by sympathy, tell us, that as the 'effect of sexual communication is so important, it cannot be indifferent to the design of nature to what part of the uterine system the semen should be conveyed;' but in the frog we find that to no part of the uterine system it is conveyed; the seminal excitement to call up the chain of sympathising actions is here wanting, yet the necessary actions are excited, the ova are expelled, and then the semen is required, not *indirectly* to cause impregnation, but *directly* to effect it by actual union; for unless this contact be permitted, no tadpole can be produced, but the ova must undergo those changes to which all dead animal matter is subject; they must undergo the processes of decomposition and putrefaction, and their elementary parts thus separated, must be scattered around, and driven in the 'desert air' in search of new elections, to enter into new and varied combinations.

"Now I must again ask for what purpose the semen is discharged? It is not applied as a stimulus; and it would be impious to say that the Creator has given it in vain. Here I shall perhaps be told that the frog is not man, and that analogical reasoning is not to be relied on; but however different man may be in structure and appearance to the frog, they alike have certain parts, producing certain and alike secretions, destined to serve particular purposes, to effect which there must be a similitude in action; thus in both there are the gastric juice to effect digestion, the bile to correct the acescent tendency of food, and to keep up the peristaltic motion of the intestines, and the semen to propagate the species."

The author next introduces the commonplace, but strong objection against those who exclusively give to either sex the power of reproduction; "when a negro man embraces a white woman, why is it that the offspring is a mulatto? When a male ass copulates with a mare, why does the mule partake of the nature of both? And when dogs and bitches of different species have intercourse, why in appearance do the mongrel whelps claim affinity to both parents? Again, it is a self-evident truth that a child may inherit the disposition to the constitutional diseases of either parent; and shall it be said that it is in the power of *sympathy* to hand down to posterity the contaminated habit of the father? Besides, if the semen be

be allotted merely to stimulate the uterine system, it would seem a totally unnecessary secretion; for we find that the sexual act is not wanting, even to effect those changes, which the semen, by this theory, is only permitted to perform."

In page 21, the author vindicates the reference to comparative anatomy and physiology in explaining the general operations of nature in all animal bodies: "It has been before observed that man and the frog have alike certain parts, producing certain secretions, destined to serve particular purposes, to effect which there must be a similitude in action; and then the office of the gastric juice, the bile, and the semen was quoted. But it is not in these alone that the frog and other animals are akin to man; there is scarcely an action in the human frame, barring the mental operations, which cannot be coupled by almost every animal. Most animals subsist like us; they breathe *; and will any physiologist assert that the depuration of their blood is of less importance to them than to lordly man? Will any physiologist, however warm and fertile in imagination, and however wont *to diversify* the *general* laws of nature, hardily assert that the same energies and powers are not displayed in all animals in the wonderful performance of muscular action? Will he say, that the stately movements of the elephant, the agile turns of the flea, and the light steps of graceful woman, are governed and directed by laws dissimilar and distinct? He cannot, dare not indulge in the adoption of such glaring error,—error which must vanish on the least light of consideration, and have habitation only in the vapored head of its supporter.

> 'The gen'ral order, since the whole began,
> 'Is kept in nature, and is kept in man:'

and

> ——————'the universal cause
> 'Acts not by partial, but by gen'ral laws.'

"The same general order, the same universal action in all animated beings, is equally conspicuous in the nervous power, as in muscular contraction. Most animals have their senses as in man, and the impressions on them are communicated in no way different to man. Injure, or divide a nerve in any animal, and the same effect will universally be produced: compress the fountain of nervous energy, the brain, and the

* "Though many animated beings are without lungs, all have an equivalent; a something pointing to the same intention; thus the fish is supplied with gills, and the insect with spiracles."

same

same result will invariably present itself, as when by any accident in man his skull becomes depressed : why then shall it be said that analogical reasoning is too deceptive to be trusted to? Why shall it be doubted, or denied, that the mode of impregnation is alike in all animals? The regeneration of animated beings is the grandest work of nature; and, as the governing laws of animal life are so similar, it may be inferred, and that without any gigantic step of probability, that the modus operandi in propagation is the same."

To the opinions of Spallanzani and Buffon Mr. Pulley has opposed no objections which have not frequently been urged by other men; he wishes to prove, that the latter has borrowed his hypothesis altogether from Dr. Highmore; and in truth they appear very similar. Buffon's, however, may be his own; and his ingenuity ought not to be questioned, because another man happens to have previously attained the same point by, probably, a different route. The author concludes: "Impregnation I believe to be effected by the seminal fluid of the male having actual contact with the contained matter of the ovum, or vesicle, of the female; and such contact I regard as the almost instanstaneous consequence of the ejection of the semen from the male. The ingenious Dr. Smellie, and others, have conjectured, that the semen may be carried to the ovaries by an absorbent action; and if we reflect on the great power and velocity of absorption, we shall be here led to acknowledge the utility of its agency. The late Mr. Cruickshank, in his incomparable work on the absorbent system, has proved by experiment that the lacteal vessels are capable of conveying their contents the distance of four inches in a single second; so that, allowing to the uterine system the power of absorption, and supposing (to avoid scanty measure) that the semen has full two feet to be conveyed, it would attain that distance in the space of six seconds; and on substracting three fourths of the velocity in absorption, we should still find the important work completed in less time than half a minute! But having admitted all this, we are told that the fimbriated extremity of the fallopian tube does not embrace the ovary during coition, or for many succeeding hours; this is asserted, but who has proved that the fimbriæ do not envelop the ovary, or a part, during the continuance of sexual intercourse? It is futile indeed to say that they are not in contact with it at that moment, because the fallopian tube is found in its usual situation a few minutes after coition :

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it might as well be argued, that the penis of a man is not erect in the plenitude of venereal pleasure, because it is found drooping a few minutes after consummation! But at what period is it most likely that the fimbriæ should embrace the ovary? I believe it is generally admitted that the peristaltic motion of the fallopian tube is most active when the vascular turgescency of the uterine system is most conspicuous; this has been proved by experiments on rabbits highly disposed to receive the male, even where no sexual intercourse has been permitted, and in such the fimbriæ have been found tightly embracing the ovaries. Every one must know how high, how exquisite, are the sensations of animals in the moment of coition: how 'tremblingly alive' to the keen impulse of desire! The whole frame 'pants furious,' and is huried on as it were by irresistible convulsions; while then the whole body is so animated, and the circulation in general so quickly excited, we must expect that the uterine system, to where the operations of nature are then directed, must largely at that moment partake the disposition to excitement; and so it is found to do; the whole link of the procreative parts, from the vagina to the ovaries, is loaded with blood, and wears the appearance of the highest irritation. At such time then it is reasonable to conclude that the fimbriated extremity of the fallopian tube invariably embraces the ovary, and remains there fixt until the semen is applied to the ripening vesicle, which may be effected by the close of copulation.

"It is no matter of astonishment that the fallopian tube should resume its usual situation a few minutes after coition: with the end of copulation, ends the motive to excitement; languor is the consequence, it prevades the whole system, and consequently those effects depending on excitement are no more. After impregnation, for a while the silent operations of nature appear as at a pause, and the embryo of future man tarries in the ovary till its evolving habitation is prepared for its reception; such process occasions new excitement, fresh determinations of blood are consequently effected, and the fimbriæ are recalled to embrace the embryo, and conduct it to the uterus."

On the whole, we may say, that we have found nothing particularly new or interesting in this Essay; but the author deserves credit for the manner in which he has arranged his materials, and his Essay may be of some use in protecting the speculative student from the speciousness of the arguments of

of a few men, whom a bold imagination and superior ingenuity have led to form opinions, different, we believe, from almost all the rest of the world.

FOREIGN LITERATURE.

ART. IX. *Principes de Physiologie; ou Introduction à la Science experimentale, philosophique, et medicale de l'Homme vivant:* i. e. *Principles of Physiology; or, an Introduction to the experimental, philosophical, and medical Knowledge of living Man.* By CHARLES LOUIS DUMAS, Medical Professor at Montpellier. Three large octavo vols. Paris. Price 21 francs.

THE progress of natural history; the rapid discoveries in a science, created, as we may say, in our own days; the detached researches of some celebrated men in several branches of the animal economy; the errors and the imperfections of the existing treatises on physiology, have long rendered a new and well written work on that subject essentially necessary. Every thing seemed to impose it on Cit. Dumas, as a duty, to publish a work, wherein the correctness of his method, the progress of his pupils, the novelty of facts and their connexions, appeared to secure him success. Never were circumstances more favourable, never were expectations better answered. In a preliminary discourse the author first points out the best method of *philosophizing* in the sciences in general. Educated in Bacon's school, he shews the necessity and the exclusive advantages of experiment, analysis, and induction: he afterwards applies these three powerful means to anatomy and physiology; and we must be fully sensible, that the first has much to expect from experiment, while the second, the daughter of reflection, owes much more to the two other principles. The author, to arrange his materials with more order, and point out his intention with more precision, distinguishes these two sciences, each into three parts: an historical or descriptive part; a philosophical or reasoning part; a medical or practical part: and each of these is considered with all the developements we had a right to expect.

Although, hitherto, the history of our knowledge in the sciences has had little more influence on the minds of the learned, than the history of nations has had on the happiness and improvement of society, we cannot, however, deny, that good effects may be expected from a well-digested exposition of the various systems which have successively prevailed.

 Citizen

Citizen Dumas takes a view of them all, and from thence draws this truth, that the predominating spirit of every age has exercised a controlling and unhappy influence on the knowledge of man. He reduces the systems which have successively prevailed, to three; 1. those of the mechanists and chemists; 2. those of the "*animistes*" and "*solidistes*;" 3. those of the vitalists. It would have been unjust and unphilosophical not to have judged them all by a common and impartial standard, and to have reduced them all to their real value. Two simple and powerful modes have been sufficient for our author: 1. to suppose the reverse of the phenomena, and to adapt thereto the same explanation; 2. to push the explanation to the last result. These different theories have not been able to resist those attacks, a happy use of which makes us sensible of all their force.

Nothing has been more unfortunate for the science of man, than the exaggerated pretensions of the other sciences, as Cit. Dumas has proved. To determine the connexions and power of each, was therefore the proper means of rendering to each what was its due; thus the examination of the connexions of the sciences of anatomy and physiology with the mathematics, philosophy, natural history, and chemistry, offers the most happy effect. It must be evident, how difficult it is to point out here the results our author has obtained: every one will readily perceive that the more the different functions are connected with exterior objects, with the composition and combination of their principles, the more they are under the dominion of the physical sciences.

Nor was it of less importance for him successfully to investigate the phenomena of life, to inquire into the differences established by nature between living bodies and inanimate substances. All the phenomena of the latter are the results either of motion or of form: the acts of life seem to be of a superior order; the power of assimilating different substances, faculties of feeling and of moving: and another power, called by the author, *vital resistance*; all seem to be far removed from the dominion of the physical sciences. In a third part, the author proceeds directly to the study of man. The circumstances of his formation, and structure, of the modifications arising from age, sex, temper, and custom, are considered at great length.

The first volume concludes with an examination of the modifications which man receives from external objects. The author developes an idea of Hippocrates, which makes medicine consist

consist in a study of the connexions of man with the rest of nature. He points out the influence which the treatise *De Aëre, Aquis, et Locis*, might possibly have on some fundamental ideas. The influence of man upon man himself is examined with care; the sensations, the exercise of thought, the passions of the mind, and particularly the successive and regular order of the functions, are placed in the number of the most remarkable exciting causes. This order supposes, that all the systems of the organs among which the powers of life are distributed, lend each other their mutual help, and sustain themselves constantly by the intimate relations which have co-ordained and connected them with each other. The action and reaction of these organs, further developed in their pathological relations, furnish Citizen Dumas with the idea of a nosologicial classification, which is peculiarly his own. His system extends to seven classes. The division is shewn in a table: as, the nervous or sensitive system, having its centre in the brain; for principal phenomena, sensation, the exercise of the sensations predominating in infancy and the female sex; the nervous temperaments; hot climates; diseases arising from excess, default, or irregularity of action; deranged organization of the system, from the excess or defect of influence of other things upon it. Each of the other systems, the muscular organs; vascular or calorific,—visceral or restoring,—lymphatic or collecting,—sexual or reproductive,—osseous or fundamental, are all examined with the same care.

The author afterwards examines the organic structure of the human body; the composition of the fluids and solids which form it is elucidated by chemical analysis and physiological observation. Here an opportunity presented itself of considering the solidity of the chemical theories applied to the etiology of diseases. Profound knowledge in chemistry and medicine has furnished Cit. Dumas with the means of advantageously refuting some theories, which would never have been produced, had their authors been equally informed in these two sciences.

To take a rapid view of the immense field of living nature, and arrive by means of general considerations at exact results on the principal points in the science of man, has been the aim of the author in the first part of his work. In those which follow, he attempts the particular history of the functions, their laws and mechanism.

But little satisfied with the divisions of the functions hitherto adopted, he proposes another, which is peculiarly his own, and which seems to connect the phenomena better. The imperfection of the divisions into vital, natural, and animal; into interior and exterior functions, is first demonstrated. Each of these uniting what ought to be separate, and separating what ought to be united, does not embrace all the phenomena, and they are as faulty in their denominations as in their nature. The common end of each function is to preserve the body in its natural state. Of the actions which produce such preservation, some tend to the same end, and ought consequently to be comprised in the same division. The means by which nature operates this preservation may be referred to four general heads: 1. To establish suitable connexions between each animal and the external objects which surround it: in this are included all those functions whose end is to procure a succession of phenomena which secure to man the power of freely communicating with those objects, by a perpetual action on the sensitive and motive powers. 2. To maintain the solid and fluid organs of the animal body in their natural state of cohesion, consistence, expansion, and temperature: the functions of the vascular and pulmonary system produce these effects. 3. To preserve to the substance of the body its qualities of composition:—all the functions of the visceral and absorbent system are arranged under this class. 4. To regulate all the physical and moral relations which unite each individual to his species.

The author afterwards proceeds to the first class of functions. All the phenomena relative to feeling and motion are explained with clearness and precision. He first treats of sensibility, of the parts endowed with it, of its variations and extraordinary phenomena. He places the disputes between the Hallerians and vitalists in their true point of view. He shews that the nerves do not possess any exclusive sensibility; that particular circumstances, especially a pathological state, give them a tension, an energy, which experiment and observation can alone point out with success.

Next follow the descriptive enumeration of the principal organs of sense; the structure and intimate composition of the nerves; their analogy in the different animals; the interesting results which arise from that comparison; the action of these organs; the laws of sympathy, the greater part foreign to the action of the nerves: the examination of the use

use of the nerves; and the explanations, more or less ingenious and futile, of their action; the fundamental laws of motion and feeling.

The senses are at first examined generally; and their mechanism being designed to secure the continual commerce of the animal with exterior things, belong to them as much as to the animal himself. The laws which regulate their functions require, to be properly judged, the knowledge both of the physiologist and natural philosopher. The author afterwards considers the phenomena and the mechanism of each of them, and dwells on their comparative examination as well as the different agents which have influence over them. He takes a cursory view of the external senses, and points out the advantage of a comparative physiology and ideology. Here he concludes the first section of this part.

In the second, the author examines motion, the result of the power of expansion and contraction, which the fibres enjoy. He proves that the muscular parts are far from possessing these powers exclusively, as Haller asserted; that they shew themselves in many others by different particular stimuli. A comparison of sensibility and irritability leads him to point out wherein they differ, and wherein they are connected; the influence of the one on the other; and to shew the mutual independence of their developement.

The author proceeds to an enumeration of the muscles, classed in a perspicuous manner, which is his own; then to considerations on the structure and decomposition of the fibres, and their comparative examination. The phenomena of muscular motion; the conditions of this motion, which may be reduced to the integrity of the nervous system, to the liberty of correspondence of the muscles with the heart, to a less degree of cohesion of the muscles; are afterwards developed with the greatest care. Cit. Dumas applies mechanical knowledge to the use of the muscular parts, and treats of standing, leaping, &c. The skeleton of a leaper who could execute a great variety of motions, and some rapid leaps, although his inferior extremities were formed only of one piece, affords him the means of demonstrating the insufficiency of many theories advanced respecting leaping.

The second class of functions is considered with the same care, and the same detail as the former: the phenomena they present are the result of the action of the blood-vessels, and of the blood on the organs. The circulation, the organs which carry it on, their structure, their developement, their comparative

parative examination, the reciprocal action of the heart, the brain, the lungs, are the objects of the first chapters. In the succeeding, the author examines the different methods of estimating the powers of the heart; and proves their insufficiency.

One of the phenomena, in the explanation of which the various theories have been applied with the least success, is the cause of the motion of the heart and the blood-vessels. All these vain theories fall to the ground before the author's impartial examination. He proposes a new one, or, to use his own modest expression, some conjectures, which are supported by many experiments. The natural tendency to motion which life gives to these organs, appears to him to be necessarily excited by an expansive vital force in the blood, the action of which can branch out and exercise its power at greater or less distances; so that the living organs have the power to act at certain distances, and to spread around them an atmosphere of feeling and activity; thus the strength of a centre of animal vitality excites and developes the functions of every part acting within its vortex, and on which it exercises its power at a distance. Considerations follow, on the direction of the blood; its force of weight; its volume; its mass; its difference in the arteries and veins; on its course through the lungs; and on the Harveian circulation.

A refutation of the laws of hydraulics, applied to the motion of the blood, concludes the first section. In the second, the action of the air and heat on the solids and fluids, and the result of respiration, are considered. An anatomical, chemical, and physiological examination of the organs by which it operates, arrests the author for some time; he afterwards considers the atmosphere, and its actions on the human body. Many experiments of the author's own, shew the effects of different gases on the pulmonary organs. The physical and chemical mechanism of respiration, and the phenomena and laws of animal heat, afterwards fix his attention, and shew the insufficiency of the different hypotheses established for their explanation.

A number of circumstances have obliged Citizen Dumas to defer for some time the publication of his researches and labours on the two other functions, which will complete his principles of physiology. He gives, in an Appendix, the method he means to pursue, and the nature of his researches. All the phenomena of digestion and nutrition, of secretions and excretions, the physical and moral connexions

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existing between the individual and the species, are so many objects which he proposes to treat of at considerable length.

It may be easily conceived how very imperfect the idea we have given of this valuable work must be.

[*Annales de Chimie.*

ART. X. *Le Therapeute, ou Medecine raisonné.* i. e. *Therapeutics, or rational Medicine.* By Cit. GERLET, Physician. 4 parts. Octavo.

MANY editions of this work have been rapidly sold. The author inquires into the causes of diseases from their effects, and points out the proper preservative, as well as the most efficacious remedy; and the danger from those who prescribe according to a blind routine. He elucidates the diagnostics, prognostics, and cure of wounds; gives a collection of particular recipes, and points out the regimen which agrees with different constitutions.

This work, to which he has joined an abridgment of the six parts of anatomy, is principally designed for people situated in the country. He presents an approved system of therapeutics, a well-digested plan of surgery, an economical chemistry, and a manual of botany, adapted to the use of every one. Each copy is signed by the author.

[*Journal Gen. de la Lit. Franç.*

ART. XI. *Les principales Connaissances pratiques, medicicinales et chirurgicales, mises à Partie du Peuple; ou Elemens de l'Education du Medecin:* i. e. *The Principles of practical Physic, both medicinal and surgical, intended for general Use; or Elements of medical Education.* By F. J. ROYER. 3 vols. octavo. Near 800 pages. 9 livres.

THE first volume, which contains the Introduction, forms, as it were, a separate work. The author therein presents some reflections on the education of a physician, and on the corporal and intellectual faculties which are supposed necessary. These are followed by a medical bibliography, divided into three parts; medical, surgical, and pharmaceutical. In the other chapters the author treats of the course of study, of the manner of practising physic, of diagnostics, prognostics, and the causes of diseases.

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The principal medico-practical information is contained in the two following volumes. The first section treats of acute disorders; of inflammatory disorders; of humoral and nervous maladies. Many particular essays on those remedies which are in daily practice follow these first memoirs; such as bleeding, emetics, purgatives, the bark, vesicatories, &c. The author has taken care to point out the particular cases which require the administration of any of these remedies; those in which they are prejudicial; and those which require great circumspection.

The second section treats of chronical disorders; the third, of surgical diseases, and the fourth, of the manner of observing, of the qualities of the observer, and of the observation with respect both to diseases and remedies.

[*Journal Gen. de la Lit. Franç.*

ART. XII. *Traité raisonnée de la Distillation; ou la Distillation reduit en Principes.* Par M. DEJEAN. Nouvelle edition, revue, corrigé, et augmenté. i. e. *A rational Treatise on Distillation, or Distillation reduced to Principles..* By M. DEJEAN. A new edition, revised, corrected, and enlarged. 2 vols. duodecimo. 3 liv. boards.

[*Journal Gen. de la Lit. Franç.*

ART. XIII. *Traité de Splanchnologie suivant la Methode de Desault:* i. e. *A Treatise on Splanchnology, after the Manner of Desault.* By H. GAVARD, his Pupil. Octavo. 582 pages. 4 livres.

[*Journal Gen. de la Lit. Franç.*

ART. XIV. *Lettres à Madame de ** sur le Vaccine:* i. e. *Letter to Madame ** on the vaccine Inoculation.* By J. P. COLLADON. Duodecimo.

THE author of these letters (which are four) endeavours to reconcile mothers, whose tenderness revolts at all innovation, to this practice. The first letter gives a history of this inoculation; the second an account of the disease; the third shews the utility of the new method; and the fourth answers the objections which have been brought against it.

[*Journal Gen. de la Lit. Franç.*

ART.

Art. XV. *The Art of prolonging the Life of incurable Persons.* By Dr. Struve.

THIS interesting work, which has lately appeared in Germany, forms the third part of the author's Asthenology, a publication which is considerably original, and contains several rare and important precepts, a few of which we shall give to our readers. The author has made ample use of the advantage which he enjoys in being physician to four hospitals for aged persons; so that the experience which he possesses in the treatment of the diseases incident to advanced age is probably greater than that of most practitioners. He acknowledges his obligations to the Brunonian system, which, indeed, he follows more closely in this than in the former parts of his comprehensive work.

The author's opinion will, perhaps, be allowed, that where the object of medical treatment is only to preserve health, and not to cure a disease, an old physician is preferable to a younger, as being less likely to lose his patience, and to be carried away by imagination. It would also seem, generally speaking, that an old physician is better suited to a patient of a like age than a younger practitioner; for an old man feels, knows, and better estimates, the state and habit of body induced by advanced years, and the wants and resources of that time of life.

The author then gives a few theorems after the manner of Brown.

A stronger stimulus does not, as is commonly believed, destroy a weaker: it only lessens in a greater or less degree the force of the latter.

Sthenia is always more violent when it is preceded by a considerable asthenia, and vice versa. A famished person suddenly filled with food, dies apoplectic. Drunkards, if they immediately begin a total abstinence from drink, expose themselves to incurable diseases.

Sthenia becomes more violent in proportion as it alternates more completely with asthenia, that is to say, in proportion as the habit is more frequently exposed at one time to sthenic affections, and at another, to asthenic. By this perpetual irritation the organization becomes so susceptible, that it is very liable to suffer in the highest degree from sthenic diseases.

This principle is of the greatest importance for practitioners to be aware of, since it proves, that a sudden transition from

one extreme to another, (as, for example, from cold to heat, taking cold liquors when the body is hot, which often destroys the tone and energy of the stomach,) may lay the foundation of an incurable disease, which sometimes remains long concealed, and then shews itself by the most alarming symptoms.

The Russian who in coming out of the hot bath plunges in the icy waters of the Neva, hardens his constitution, it is true, and increases the vigour of his body; but he has little chance for life if he is attacked by an acute disease. If, for instance, it is a putrid fever, the assistance afforded by art is seldom of any avail; for the dissolution of the organic parts of his body advances with a most alarming rapidity. A violent attack of gout shews a disposition to incurable disease, when brought on by a long-continued alternation of sthenic and asthenic irritation. The only method which then remains to avoid an immediate transition to an incurable state, and to prolong a feeble existence, is to keep up as much as possible a high degree of direct asthenia.

In the treatment of certain mortal and incurable disorders it will be immediately understood, that the only indication is to render the danger less imminent, and the state of the patient more tolerable.

Hectic fever. Certainly there is no disease in which the indirect method, the *festina lente*, deserves to be so much recommended as in this disease of languor, in which most benefit is to be derived from an attention to regimen. In the beginning the physician is more induced to give irritating remedies, than in the progress of the disease, when the access of fever is more constant; consequently, the more the irritability increases, the more does repose become necessary, and all causes of irritation should be avoided; but, however, it should not be forgotten, that as this disorder is asthenic in the highest degree, the use of sthenic remedies becomes therefore indispensable, in order to prevent its arriving to the highest state of direct debility.

Marasmus senilis, phthisis of the aged. If the patient be very weak, but can bear to take milk, his whole nourishment should be milk warm from the cow every six hours, and at noon a cup of chocolate with toasted bread. Stimulating remedies, such as infusion of bark, musk, opium, wine, frictions, heat, ether, and the like, should not be constantly persisted in, but should be given from time to time on any failure of the strength, and should be interrupted as soon as the immediate object of their use is obtained. Fomentations with three

parts

parts rice water and one part wine, or cataplasms with wine applied to the belly, are likewise very efficacious remedies. Advanced age also requires cordials used in moderation, and in proportion to the kind of life which the person has led.

Phthisis pulmonalis. To persons suffering under this disease life is prolonged by firmness of mind, a fixed attention on particular objects, confidence in physic and the physician, a quiet conscience, a regular train of ideas, and mild transitions from one sensation to another.

Particular remedies are of service merely because the patient has confidence in them; and consequently it is proper, in the latter stages of the disorder, to vary the medicines, and to endeavour to prepossess the patient with confidence in the remedies that are to be employed.

ART. XVI. *Journal der Pharmacie für Aerste, Apotheker und Chemisten:* i. e. *A Journal of Pharmacy, for the Use of Physicians, Apothecaries, and Chemists.* By J. B. TROMMSDORFF. Vol. VIII. Part I. Large octavo, with plates. Leipsic.

THE learned and laborious author of this Journal divides it into four classes: the first, composed of Memoirs, contains, 1. The Description of a new Pipe, which will conveniently serve as a Lamp, by *F. W. Voight*—2. An Examination of *Lenhardt*'s Tincture of Health, by *Manthey*—3. The Analysis of Opium, with some Observations relating thereto, by *Bucholz*—4. A chemical Analysis of a muriatic Spring near Erford, by *Locher* and *Funke*—5. The Preparation of corrosive Sublimate, by *Van Mons*—6. A new Method of preparing the *Syrupus balsamicus*, by the same—7. Observations on the Method of dissolving Phosphorus, by *Schmidt*—8. On *Proust*'s Method of separating the gallic Acid, by the Author—9. On *M. Lowiz*'s new Process for dissolving Alkali, by the same—10. On the Decomposition of *acido-sulphuric Natrum*, the moist Way, by the same—11. On the Preparation of Phosphorus from human Urine, by *Giobert*'s Method, by the same—12. On the golden Sulphur of Antimony and the Kermes Mineral, by the same—13. On the Combination of Acid of Chrome with the metallic Oxyds, by the same—14. Examination of a German Fossil containing Chrome, by the same—15. Analysis of the Beryl of Saxony, by the same—16. A Description of the

 Beryl

Beryl of Saxony, by *Borchardt*, &c.—The other three classes are composed of extracts from correspondents, analyses of new works, and literary notices. [*Journ. de la Lit. Etrang.*

Art. XVII. *Anatomisches Handbuch, &c.*: i. e. *A Manual of Anatomy.* By J. C. Loder. Vol. I. containing Osteology and Syndesmology. Second Edition, considerably enlarged. Octavo. 476 pages. Jena.

THE first edition of this work appeared in 1788; the author's intention was to give a course of anatomy as complete as the form of a manual would permit; omitting, therefore, all physiological applications. The parts are described in the order in which they present themselves naturally, to facilitate the study of anatomical pupils; and the author, in consulting his predecessors, has constantly followed the course of nature. As to the terms, after having given the Latin names, he explains the origin of the technical terms, their composition from the Greek language, where there are such, and then adds the German denominations in all cases where they are clear; in the contrary case, he preserves the Latin term, as being the most correct and familiar to the anatomist.

[*Journ. de la Lit. Etrang.*

MEDICAL INTELLIGENCE.

Art. 18. *Observations on the Effect of Galvanism in a Case of Palsy on the left Side of the Face.* By C. Hallé.

A MAN whose muscles of the face on the left side, and the inferior muscles of the globe of the eye, were palsied, in consequence of a continued defluxion occasioned by cold, had been often electrified; he experienced neither sensation nor contraction when the part affected received the spark, and those present could scarcely perceive a weak contraction in the jugo-labial muscle, *(grand zygomatique,)* when electricity was applied by shock. This man had the action of the galvanic pile of fifty stages applied, by chains and metallic exciters carried from the two extremities of the pile to different parts of the diseased cheek.

At the moment of contact all the muscles of the face were contracted, and the man complained of pain and a very dis-

2 agreeable

agreeable sensation of heat; the eye was convulsed, tears involuntarily ran from it, and there appeared both heat and swelling on the different parts which were touched.

These experiments, which seemed to afford some means of comparing the effects of galvanism with those of electricity, were repeated several following days after the 26th Prairial, the day on which Cit. Hallé first gave a report on the subject to the Institute. It was observed, that the muscles remained contracted some minutes after the galvanic shock, and that the left eye followed the motion of the right.

In this application of galvanism to the human body, Cit. Hallé remarked some very singular anomalies. The pile was frequently a long time before it communicated its effect; sometimes it was wholly interrupted for several seconds, and it appeared in two cases, that the fluid experienced some impediment in its course. In these cases it was sufficient to moisten the flesh, to rub it, and to change the respective position of the rings, to make them communicate; in general he observed, that, in order to procure a sensation quickly, it was not sufficient to moisten the skin, but it must be wet, and even drenched with water. M. Hallé, and several other persons, who tried the experiment on themselves, found what kind of effect galvanism produced. It caused a sensation somewhat like the pricking of pins. The pain was sharp, accompanied with a sensation of heat, and something of a metallic taste, when the exciters were applied to the salival glands.

Art. 19. *Method of preserving anatomical Preparations.* By Citizen Chaussier.

Citizen Chaussier has communicated to the Society of Medicine at Paris, a new method of preserving animal substances. After having enumerated the different methods employed for that purpose, he points out their defects and insufficiency. For preparing parchment, the skins are macerated in water, disengaging from them the unctuous particles, and dissolving likewise a part of the mucilage, so that nothing remains but the fibrous part. For tanning, the hides are put into lime-water, sulphuric acid, or into a solution of alkali, and afterwards exposed to the action of the *tannin* or tanning principle. For preserving anatomical preparations, they are generally put into alkohol, which dries them up, and entirely changes their proper form; and though they are in this way preserved from putrefaction, yet they do not remain untouched by the insects.
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The carbonat of soda, and the sulphat of iron, which are also used for keeping off putrefaction from animal substances, render them soluble in water by combining themselves with the unctuous particles, and forming a soap with them, whereby the size and form of the preparations are considerably altered. In order to avoid all these inconveniencies, Cit. Chaussier suffers the part intended for preservation to be macerated during a longer or shorter time, from three to eight or ten days, according to their respective size, in a solution of oxygenated muriat of mercury in distilled water. This liquor being always kept in a perfect state of saturation, by adding from time to time fresh muriat of mercury for that which is decomposed, imparts a great solidity to the parts impregnated with it, by giving consistency to the gelatinous parts, without changing their size and form; and when exposed to the air for some time, they are secure from corruption and insects. It is through the medium of this mode of preparation, that Cit. Chaussier has made several interesting observations on the structure of the brain, and particularly of the spinal marrow; for he discovered that this part, after being deprived of its pia mater, is composed of six very distinct bundles; farther, that all the nerves which arise from this part of the brain are by no means simple productions of its fibres, but that they are inserted in it like hairs, by means of bulbs which adhere to the medulla by several small roots; and when these nerves are pulled out, a double row of small regular holes will appear to the eye, into which the bulbs are implanted. A portion of brain, presented to the Society by the inventor of this method, had the solidity of wood, without the least change in its natural size and form; another brain and spinal marrow prepared in the same way, very distinctly shewed the holes into which the nerves were ingrafted. The celebrated Ruysh made also use of a liquor and of injections to preserve his excellent anatomical preparations, by means of which he had succeeded in preserving the body of his own daughter, in the colour of life and freshness of youth. This liquor, which he always kept as a mystery, seems to be the same with that of Cit. Chaussier, or at least something analogous. According to Ruysh, it likewise made the gelatin solid, and by degrees as hard as wood; the albuminous matter coagulated by it, and the crystalline lens put into it, became opake and white; the brain obtained in it a caseous and solid consistency. For colouring the injections, it is advisable to take madder or cinnabar, but never to make them of wax, or any other unctuous matter, but of a muci-

laginous

laginous solution, as the solution of ichthyocolla, or isinglass. After having injected the parts, they ought to be put into the above solution of oxygenated muriat of mercury, where the matter for injecting concretes, and becomes solid. For preserving whole bodies, it is necessary to make openings into the great cavities, head, chest, and belly, large enough for the liquor to penetrate into them, as without this precaution the intestines will not be secured from corruption. Ruysh himself always made such incisions for the above purpose.

Art. 20. *On the phosphorescent Properties of the medullary Substance of the Brain and Nerves.* From the Memoirs of Citizen Cabarris, read before the French National Institute.

It is well known, that phosphorus is derived from animal matter; it is also indeed found in the mineral kingdom; but it may be questioned whether its origin, like that of calcareous earths,* may not always be referred to animal recrements; that, at least, which is the direct product of these recrements, may be considered as the immediate effect of sensitive life, as a result of the changes which the animal solids and fluids are susceptible of undergoing, or as one of the simple substances which they possess the peculiar property of assimilating. In the bodies of animals which are undergoing decomposition, phosphorus appears to enter into a slow combustion. Without producing real flame, without, at least, the power of igniting combustible bodies in its immediate vicinity, it becomes luminous, and throws out flashes of light amid the surrounding darkness, sufficiently vivid to afford some real foundation for the existence of those phantoms, which people are at once desirous and afraid of seeing, in the neighbourhood of cemeteries. The brain and its appendices, or rather the nervous system in general, appears to be the peculiar reservoir of phosphorus; for it is the incipient decomposition of the cerebral pulp which gives rise to those phosphorescent lights, which, during the darkness of the night, are frequently observed in anatomical theatres; and it is chiefly around the brain, exposed by being deprived of the natural coverings, or the fragments of nervous matter lying on the tables, that they are perceived. A variety of observations have led Cit. C. to conclude, that the quantity of phosphorescent matter developed after death, bears some proportion to the activity of the nervous system during life. He thinks he has noticed, that the brains of persons who have died of diseases marked by a strong augmentation of this activity,

activity, gave a greater, as well as a more vivid light. Those of maniacs are peculiarly luminous; those of dropsical and leucophlegmatic subjects, much less so.

Art. 21. *Professor Schumacher on indigenous Plants.*

Professor Schumacher, of Copenhagen, has just published the first volume of his *Medico-chirurgical Observations.* As the author is attached to the service of the hospital, he must naturally have occasion to make curious remarks, and such as are worthy of record. His zeal has led him to endeavour to substitute the use of indigenous plants, to that of foreign vegetables: for example, he usually employs the gratiola instead of ipecacuanha. When this herb does not operate sufficiently alone, he recommends to assist it by a little rhubarb. He has likewise discovered, that in wounds and ulcers with inflammation, the *cortex hippocastani*, or *salicis*, has the same effect as the *cortex peruvianus*, which is much dearer. The *carex arenaria* may be substituted with equal success for the sarsaparilla. In intermitting fevers, with the help of such another *cortex*, there is no longer occasion for the cortex regius. And, lastly, it results from his experiments, that the *fabæ picharim* is an efficacious remedy in fluor albus, especially when the malady is inveterate.

THE

LONDON MEDICAL REVIEW.

VOL. VII. N° XXXIII. NOVEMBER MDCCCI.

ART. I. *An Account of the regular Gradation in Man, and in different Animals and Vegetables; and from the former to the latter.* Illustrated with Engravings adapted to the Subject. By CHARLES WHITE. Quarto. 146 pages. MAWMAN, London. 1799. Price 10*s*. 6*d*.

IN the second volume of the London Medical Review and Magazine some account was given of this work, though our limits admitted little more than a few extracts; but the plan of the critical part having been enlarged, while at the same time we have had leisure to consider the subject more minutely, we trust that the following observations will not be unacceptable to our readers.

The subject of this performance, our readers will recollect, was agitated, some years ago, by the promoters and the opposers of the abolition of the African slave-trade. As the current of public opinion ran strongly against that species of commerce, on the score of its inhumanity, its abettors strenuously laboured to prove, that the negro race constituted an order of beings not properly human; and consequently, that a traffick in their persons, even though it should be attended with some disagreeable circumstances, could not properly be called *in*human. The abolitionists, however, adduced such proofs that the negroes were naturally equal to the rest of mankind, as obliged the interested advocates for the contrary doctrine, which indeed had never been much insisted on by

the more sensible defenders of the slave-trade, to abandon that doctrine as untenable.

But the abolition being still talked of, the merchants, who of late have prosecuted the trade with uncommon vigour, must naturally wish to have their theory revised, and rendered a plausible pretext (for it never can be rendered a legitimate foundation,) for their practice. We are far from affirming, however, that the present work was written with this view. We are sure it was not written with any direct view of this kind. The author assures us, that "his object was simply to investigate a proposition in natural history. He is fully persuaded the slave-trade is indefensible, on any hypothesis, and he would rejoice at its abolition." We are sorry to observe, however, that the general tendency of his work is not very consistent with these professions: and whether it be consistent with itself, and with the great acknowledged principles of the physiology of man, we shall proceed to examine; with freedom indeed, but with that candour which becomes honest critics, who are solicitous to support the character of their publication, by a strict adherence to truth and impartiality.

The work is divided into the four following parts: viz. *

Part I. "On Gradation in general."

Part II. "On the Gradation in Man."

Part III. "On Hair."

Part IV. "On the Colour and Complexion of Man."

In the first part, we observe nothing that is new and interesting, or which seems particularly worthy of remark.

Mr. W. begins the second part, "On the Gradation in Man," by telling us, that his investigation of this subject was first suggested by Mr. John Hunter's famous series of skulls. "I did not carry my inquiries," says our author, "into provincial or national varieties or features; but confined them chiefly to the extremes of the human race; to the European on the one hand, and, on the other, to the African, who seems to approach nearer to the brute creation than any other of the human species. I was persuaded that, if I could prove a specific distinction betwixt these two, the intermediate gradations would be more easily allowed."

This sort of language will enable our readers to judge from

* The present article was far advanced before we could procure Dr. Blumenbach's late work, *De Generis humani Varietate nativa.* We have therefore thrown into notes such extracts from that valuable piece, as we could not bring into the text without transcribing the whole of our manuscript.

internal evidence, of the *quo animo* with which Mr. W. entered on this important inquiry. But, if it can be proved, that even "the *extremes* of the human race" are in most particulars separated by a very small interval, it will become highly probable, that the "intermediate gradations" are (what Mr. W. himself calls them) only "provincial or national varieties;" and consequently, that he has not established "any *specific* distinction"—if indeed *such* a distinction can be said with any propriety to be compounded of *mere varieties.* Our readers will observe, that Mr. W. by *here* considering the European and African as "the extremes of the human race," *assumes*, at the very outset, the *conclusion* he proposes to infer from his *subsequent* facts and reasonings.

Mr. W. goes on to compare *one* African skull with several European, and mentions the "points in which it differed from the European, and approached to the ape." But no one of these points is expressed in any determinate measure. The words "less, greater"—"more backward, more prominent," &c. are so vague, that nothing can be concluded from them.

But, on turning over the leaf, a table presented to our view its columns of accurate measures, in methodical array. This table exhibits the stature, and the length of the *os humeri* and *ulna*, of nine European and one African skeleton, of Dr. Tyson's pigmy, and of a monkey; none of them selected, but such as Mr. W. could find in Manchester. It also contains the same particulars of several living whites and negroes. As to these last, Mr. W. tells us, that he measured the first twelve negroes and twelve whites he met with; so that no selection was made in either case. He took the length of the upper arm and fore arm; because it is known, that in apes the latter is much longer than in European men, and because he suspected that, in this particular, negroes formed an intermediate link in the gradation. Mr. W. has left his readers to make the calculations when the statures disagree; but on comparing the negro, Henry John, with the white Porter, who are both 5 feet in height, we find that the upper arm of the former exceeds his fore arm by 2 inches and $\frac{4}{8}$, and that the same excess in the latter is 2 inches and $\frac{7}{8}$; so that here are but $\frac{3}{8}$ of an inch in favour of the author's hypothesis. A comparison of the negro Anamaboe and the white surgeon, who are both 5 feet $4\frac{1}{4}$ inches tall, affords Mr. W. only $\frac{1}{2}$ an inch to come and go upon; and would it be extravagant to suppose that, in taking the measures, especially of the upper arm, in

living subjects, mistakes of this magnitude may have taken place?

In another table, Mr. W. gives the same measures of twelve human figures, including the *Venus de Medicis*, and two general proportions of European women. But, though we really believe the *data* of this, as well as of the other table, are fairly given, we think nothing short of extreme rashness could induce any man to draw a general conclusion from either. The measures, indeed, of the Venus de Medicis, and of the European woman, are to be considered as *general results*, or averages; and are too discordant among themselves to be depended on in a question of this kind. For example: the length of the whole arm of the Venus is 23 inches and $\frac{1}{4}$; whereas the length of arm here given to modern European women of the same stature (5 feet) is only 21 inches; and to modern European women, 5 feet 4 inches tall, only 22 inches and $\frac{3}{4}$. Hence, if the length of the *whole* arm were to be made the criterion, the celebrated Medicean statue would approach nearer to *apish* proportions, than any figure in Mr. W.'s tables. We have apprehended, indeed, that the fingers of the Venus are too long; but never understood that the whole arm was so *. The differences of the upper and the fore arms of the figures in this example are all considerable; but Mr. W. has given us only *one* living female to compare them with †.

In our opinion, Mr. W. might have saved himself the trouble of all his admeasurements, by previously studying the various proportions of animals, and then having recourse, as he has had in other instances, to analogy. Has he found, for example, any difference between the proportions of the European and the negro, which can be compared with that which exists between the proportions of the Arabian and Ger-

* Mr. HEYNE (in his Dissertation on the different Forms in which Venus is represented in Works of Art) says, that the right arm of this celebrated statue, from the shoulder, and the left arm from the elbow, are modern.

† Different individuals are differently proportioned; else how could one man be said to be "better made" than another? For example: a near kinsman of ours is 6 feet 3 inches tall, and extremely well proportioned; but when a neighbour of his, whose stature is but 5 feet 10 inches, is seated beside him, on a bench, their heads are very nearly on a level; the latter, however, cannot be called a well-made man: his legs and thighs are too short for his body. But that confiderably different proportions are consistent with elegance of shape, is evident from the dimensions above given by Mr. W. of the Medicean Venus, and of European women in general.

man

man horse; or, not to go out of our own island, between the large breed of Lincolnshire and the poneys of Wales, or the Highlands of Scotland? Or, still keeping within Great Britain, has Mr. W. considered the difference between our cattle with horns of almost all sizes, and our humble cows which have no horns at all? Has he never heard that there is in Normandy, a breed of hogs whose hind legs are a great deal longer than their fore legs? Has he never read of the long-legged breed of cattle at the Cape of Good Hope; and does he not know that in England there is a breed whose legs are remarkably short? We shall not ask him any questions about *solid-ungular* hogs *; having never seen any of them. But we have seen the Cape sheep, which, for aught we could observe, had nothing peculiar, but the enormous tail, which we have seen weigh 10 lbs. and some of them are much larger.

Mr. W. proceeds to *corroborate* his accurate tables of admeasurement with a rhapsody from Lavater, which fills four pages! Would it be unfair in us to consider Mr. W. as having adopted all the vague *stuff* he has here copied from the Reverend Physiognomist, about the "broad and uniform" skulls of *Dutchmen;* the "European impress" of those of their neighbours the *Germans*; about the "rude and coarse" skulls of Calmucks, and the "stiff and erect" skulls of the Ethiopians, &c. &c.?

We can occasionally amuse ourselves with Lavater's flights, which certainly are not without a foundation in nature; but we scarcely know any philosophical proposition in support of which we would not as soon think of quoting Don Quixote.

We are sorry, however, to observe, that Lavater's elegant nonsense receives but too much countenance from our author's next quotation, which is from Camper. "As soon," says that anatomist, speaking of an European skull, "as I brought the line of the face forward, I had the head of an antique; if I inclined it backward, I had the head of a negro; a little farther back, it presented the head of a monkey; still farther, that of a dog; and lastly, that of a woodcock—and in this consists the basis of my edifice."—And this also forms the basis of our author's edifice, and will enable us to judge of the solidity of the superstructure; especially as he has supperadded the snout of the crocodile, &c. and has given an engraving of the whole, forming a compendium of what may be called

* See Blumenbach *De Gen. hum. Var. nat.* p. 79.

physiological

physiological physiognomy in no more than *sixteen* figures !! This plate and its illustration, our author gravely tells us, is "a perfect and regular gradation in the inclination of the face, from the perpendicular line of the European man, to the horizontal one of the snipe or woodcock." And what does he wish us to infer from such loose and whimsical analogies? Why, that "a beautiful gradation subsists amongst all created beings." We do not wholly deny it; but we should be glad to see the steps of this gradation more clearly defined than, as we apprehend, they have yet been. We insist, in the words which our author immediately adds, that "in the animal kingdom, the different classes into which Nature seems to have divided her productions, are so blended by creatures apparently anomalous to all system, that it is often difficult, and sometimes impossible, to draw lines of distinction *." Yet, we see, this difficulty and impossibility have not deterred Mr. W. from connecting, by a very few gradations, the fine physiognomy of a Grecian antique with the unmeaning lineaments, if such they may be called, of the crocodile and the woodcock !! Even if that gradation were regular, we cannot see how it would assist us in our physiological inquiries. Would a young artist be much improved in statuary, by being told, that there was a regular gradation between a rude block of marble and the Apollo Belvidere? Must he not also be furnished with proportions and rules whereby to guide his chisel? Our author seems so sensible of this, that he proceeds to apply accurate measures to the skulls, as he had before done to the arms, of human subjects; and it must be confessed, that he has made out a very regular gradation from a *line*, 10° beyond the perpendicular, to *another line* parallel to the horizon. But we doubt, whether any useful inference can be fairly drawn from this *geometrical* gradation, unless it be, that, as far as lines and angles are concerned, our author should have left human skulls—*just where he found them.*

* *Longissime ab eorum opinione absum*, &c. says Dr. Blumenbach: "I am very far from adopting the opinion of those who, especially of late, have so much amused their sportive imaginations with I know not what continuity or gradation in nature." He adds, that there are whole genera, and even classes, which cannot, without violence, be included in such schemes of gradation; nay, that there exist whole *genera* of animals, (for example, the genus *coccos*,) in which *the male would by this mean be separated from the female! De Gen. hum. Var. nat. Epist. prælim.* ad Jos. Banks, *Bar.* R. S. L. P. See also, *Venus Physique* in *Les Œuv. de Maupertuis*, p. 231.

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On this occasion, Mr. W. again has recourse to CAMPER, who informs him, that "the facial line of a monkey makes an angle of 42° with the horizontal line; that of an oran-outang 58°; that of a negro 70°; of a Chinese 75°; of an European 80° or 90°. The Roman painters preferred 95°; the Grecian antique 100°."—So far, according to Camper *. Mr. W. then gives us an estimate *of his own*; for he has no other visible authority than the "perhaps" with which he introduces it. This estimate leaves the modern European where he was, but depresses the African from 70° to 60°; thereby *perhapsing* him at once out of 10 degrees of the "human face divine!"

The reader will observe, that CAMPER places the angle of modern European skulls at 85°, exactly in the middle between the negro and the Grecian antique; and that 80°, the least angle for the modern European, is but 10° *above* (70°) the African angle; whereas it is 20° *below* (100°) that of the Grecian antique: farther, that (70°) the African angle is 12°

* Dr. Blumenbach observes, that the skull of a negro does not differ more from that of an European, than the skull of the domestic hog differs from that of the wild boar; or than the skull of the Neapolitan horse, called, from the resemblance, the "ram's-head breed," *(caput arietinum,)* differs from that of the Hungarian horse, well known for his uncommon shortness, and the large size of his under jaw. *De Gen. hum. Var. nat.* p. 80. where he mentions some other instances of degeneration.—For his "*animadversions*" on CAMPER's Facial Line, see p. 200 of the same excellent little work.—At p. 203 he declares, that the more he contemplates his collection of eighty-two human skulls, the more he is convinced of the impossibility of reducing them to any standard measurable by lines and angles.—"Camper *very justly explodes*," says our author, p. 55, "the idea of the heads, noses, and jaws of negro children being modified by their parents."—There must be some mistake here: Mr. W. has not told us in which of CAMPER's works he met with this denial of a fact so well known, that we can scarcely believe that anatomist to have been ignorant of it. There are few individuals who have visited the Charibee islands, but must be acquainted with the practice of the native *Charaibs* in flattening the heads of their infants, before and behind, by keeping them in a state of compression between two boards. (In the *Journ. de Physique* for August 1791 is a figure of this sort of bandage. See also Edwards's Hist. of the West Indies, vol. i. p. 42, 401.) We ourselves have seen a black Charaib from St. Vincent's, whose head had been thus compressed, which gave him a frightful appearance. Dr. Blumenbach gives a number of authorities for artificial and accidental modifications of the skull, nose, and lips, among ancient as well as modern tribes, (p. 192, 214, et seq.) Nay, he tells us, (p. 217,) that his Excellency M. DE ASCH, in a letter, dated Constantinople, 20th July 1788, informed him, that it was usual for the midwives in that city to ask the mothers what shape they preferred for the heads of their children. See also the *Mem. de l'Acad. Roy. des Sc.* 1745, p. 427; also ROUSSEAU, *Emile*, tom. i. p. 19.

above

above (58°) that of the oran-outang; 28° *above* (42°) the monkey-angle, only 5° *below* (75°) the Asiatic angle, and no more than 3½ *below* (73½°) the American angle, as marked in the plate. Thus then the American savage wants but 3½ degrees of being as nearly allied to the monkey as is the African*; and we have already seen, (p. 383,) that the latter was within half an inch of being as good a man as an Englishman, aye, and a surgeon into the bargain!

Gentlemen of fine imaginations should keep to their rhetorical tropes and flourishes, and beware of meddling with numbers and lines and angles, which are dangerous edge-tools in unskilful hands. This hint is meant to be useful to men who are apt to be more flowery, than accurate, in their descriptions. But we certainly mean nothing disrespectful to Prof. CAMPER, who, though, as we have seen, he had a lively imagination, was a good anatomist, and, after all, "was decidedly of opinion, that the whole human race was descended from a single pair, and that all the varieties were occasioned by climate, nutrition, air, &c. He also, as Mr. W. tells us, "discovered, from the structure of the organ, the real reason why the oran-outang, and several other apes and monkeys, are unable to speak†;" a discovery which has been confirmed by our author's son, who dissected a monkey.

Mr. W. next proceeds to shew, that a similar gradation takes place in the cartilages, muscles, tendons, skin, hair, sweat, *catamenia*, rank smell and heat of the body, duration of life, *testes*, *scrotum* and *frænum præputii*, *clitoris*, *nymphæ* and *mammæ*, size of the brain, reason, speech, feeling, parturition, diseases, and manner of walking. He likewise endeavours to prove that a gradation obtains in the senses of hearing, seeing, and smelling; in memory, and the powers of mastication: but in these last particulars the order is changed, the European being the lowest, the African higher, and the brute creation still higher in the scale.

"With regard to the cartilages, muscles, and tendons, Mr. W. owns, we are not in possession of a sufficient number of comparative anatomical facts to allow us to state much."— Might not the author have saved himself the trouble of writing sixteen inconclusive pages, by extending to the skull and the bones

* "New negroes from Guinea generally much exceed the American Indians in constitution of body and mind." *Hist. of the Brit. Sett. in N. Amer.* by W. DOUGLAS, M.D. vol. i. p. 154.

† See the Philosophical Transactions for 1779, and Dr. Dunbar's Essays, p. 203.

a similar

a similar observation? For though the facts respecting these last are, or may more easily be rendered, numerous, they never can afford a determinate inductive conclusion, if, as we have given strong reasons to expect, the rule should admit of as many exceptions as examples.

"The skin," says our author, including the *epidermis* and *rete mucosum*, is well known to be thicker in the African than in the European, and still thicker in monkeys."—The skins of Europeans are thickened by habitual exposure to a hot sun. In tropical climates, we have seen the skin, on the hands and necks particularly, of white bricklayers, ship-carpenters, &c. rendered callous by this cause.

Of the *catamenia*, Mr. W. says, "it is the general opinion of physiologists, that they are in larger quantities in warm climates than in cold."—Mr. W. makes the African an exception to this general rule, because Dr. Sparrman has said that those things "are much less troublesome in Africa than in Europe." He by no means says that, *cæteris paribus*, they are less in quantity, which is not the case. We say, *cæteris paribus*; for in this, as in other instances, the very different circumstances of whites and blacks, in point of diet, exercise, &c. must always be considered *.

"The rank smell of many negroes," says Mr. W. "is well known."—And is not the rank smell of many whites equally well known? and does not the unwelcome odour sometimes resist all the means used to remove it? We need not refer to the *delicate* Dean of St. Patrick's for a description of *one* grand use of *artificial* perfumes, especially among red-haired yahoos †.

But "Creole negroes sustain the extremes of heat much better than Creole whites."—Very true, Mr. W. because they are generally much better inured to those extremes. We say *generally*, having seen not only native whites, but *seasoned* Europeans, perform hard labour of almost every kind, exposed to the full blaze of the sun in one of the hottest countries on the globe; and we have known them, when temperate, pursue that labour to a good old age. On the other hand, says Mr. W. "blacks in these colder climates *seem* to suffer more than we do from cold." They might naturally be expected, not only

* See Blumenbach, De Gen. hum. Var. nativ. p. 129.

† See Blumenbach, p. 164; Edwards's Hist. of the W. Ind. vol. ii. p. 62. The native Charaibs of the Antilles have a rank odour. *Chanvalon, Voy. à la Martinique*, p. 44.

apparently but *really*, to suffer more from this cause. Yet we see blacks in the streets of London pursue their business as coblers, shoe-cleaners, &c. without shrinking, more than many whites do, from our severest frosts. In Virginia, where the cold is sometimes still more severe, the negroes multiply rapidly *; in the West Indies, where, except in some very mountainous situations, they never feel cold, their numbers, we are told, cannot be kept up without constant importations from Africa!

According to Mr. W. "negroes sweat much less than Europeans:" a circumstance which we very much doubt, though we cannot positively deny it, because we never heard the observation made while we had an opportunity of making the comparison; nor indeed do we remember to have read it any where but in Mr. W.'s book. But we do well remember having superintended a few negroes in doing some hard work, which required dispatch, exposed to an intense afternoon sun, close to leeward of a high rocky precipice. For some hours, the people perspired most profusely, and, as we were coming home with them, in the cool of the evening, we observed, for the first time, minute ammoniacal salts crystallized on several parts of their bodies, particularly on their naked backs, a circumstance which we more than once noticed afterwards, and have since mentioned to some of our medical and philosophical friends in Edinburgh. We doubt not that very profuse perspiration would produce the like crystallization on the skins of Europeans, if it were not disturbed by their clothes, and rendered invisible by the whiteness of their skins †.

Mr. W. affirms, that the Africans are shorter lived than the Europeans; but in this he contradicts the experienced Mr. Long, who says, that "in Jamaica, Africans, if not far advanced in years when brought over, have been known to attain to 80 and 90, or upwards; but 50 or 60 are extremely common ‡."

"I found," says Mr. W. "with some surprise, that the testes and scrotum are less in the African than in the European."—This discovery is also somewhat surprising to us; but as the author neither tells us in how many subjects he observed

* See Jefferson's Notes on Virginia.

† Since writing the above, we find that Blumenbach, on the authority of Pechlin, affirms, that negroes perspire *more profusely* than whites. *De Gener. hum. Variet nat.* p. 76.—But we still doubt whether the perspiration of negroes be either greater or less, *cæteris paribus*.

‡ Hist. of Jamaica, vol. ii. p. 404.

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it, nor how far his observations agree with those of others—*transeat.*

Respecting the *frænum præputii,* we need only refer to our author's table, p. 45, in which no more than four out of twelve subjects are marked "no *frænum.*"

As to the *clitoris* and *nymphæ,* "Dr. Sparrman," says our author, "speaking of the *then* prevalent opinion, that the Hottentot women have a kind of natural veil which covers the sexual parts," states, that "the women have no parts uncommon to the rest of the sex; but the *clitoris* and *nymphæ,* particularly of those who are past their youth, are much elongated."—"This," adds Mr. W. "has been confirmed to me by several surgeons of Guinea ships."—But we should have been told how the surgeons obtained this knowledge; for very few Guinea ships ever visit the land of the Hottentots: and, were it otherwise, that country forms so small a part of Africa, that a description of its inhabitants would no more apply to the Africans in general, than a description of the Laplanders to the Europeans in general. Mr. W. however, candidly tells us, "that in the four or five instances he had occasion to examine, there was no material difference from Europeans discoverable."

The human mentula is very anomalous in point of size; but that, *cæteris paribus,* it is generally longer in Africans than in Europeans, we very much doubt. The same thing is said of a neighbouring nation, and even of the *sans culottes* in the northern division of this island. With respect to the first, the saying is founded in jocularity; and as applied to the second, it has not even that slight foundation in *this* country *. Now it is a maxim in logic, that *conclusio sequitur partem debiliorem:* we know that, as affirmed generally of the European nations alluded to, the premises are false; and therefore Mr. W.'s conclusion, which, from a few instances assumed as premises, assimilates the Africans, in general, to *simiæ,* cannot be admitted as true.

* But this last has been seriously maintained on the continent. Dr. Blumenbach does not mention the nation *first* alluded to above; but respecting the Africans and the *second* European people, his words are: "Nigritas mentulatiores esse vulgo fertur. Respondet sane huic asserto insignis apparatus genitalium Æthiopis quem in supellectile mea anatomica servo. Num vero constans sit hæc prærogativa et nationi pro[illegible] nescio.—Idem de Scotis septentrionalibus, qui nunquam bacca[illegible] dunt, prædicabat cl. Faust. De his vero minus recte hoc asse[illegible] ria, auctoritate gravissima docui," in Medicinische Biblioth[illegible] ...i ince-...tum esse, ...c. tom. iii. p. 413.

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The same kind of reasoning may be opposed, with equal force, to Mr. W. when, from the alleged large mammæ of the Hottentot women, (who, as we have said, occupy but a corner of Africa,) he concludes generally, that "the *African*, in this particular, approaches to the *simia*." Like the part just mentioned, the mammæ of some individuals, in all countries, are larger than those of others. Lithgow, the famous Scottish traveller, after reciting several wonders which he beheld in Ireland, proceeds thus: "Another goodley sighte I sawe, was women travayling the waye, or toyling at home, carrying their infantes about their neckes, and laying their dugges over their shoulders, would give sucke to their babes behinde their backes, without taking them in their armes. Such kinde of breasts, methinketh, were very fit to be made money-bagges for East or West Indian merchants, being more than half a yard longe*." We must observe, however, that Lithgow deals much in the marvellous. (See his life in the Encyclop. Britann.) He lived in the reign of James I.; and, as the bosoms of Irish women are now formed in "Nature's finest mould," and it does not seem feasible that the few intervening generations could have effected so great a change, we may venture to suppose, that in this instance *Maister* LITHGOW exercised his privilege as a traveller, and, *à fortiori*, that similar liberties have been taken by others in describing the breasts of the women of *distant* countries.

Size of the brain. "Man," says Mr. W. "has the largest brain of any animal; and, of all men, the European has the largest; yet some animals possess a larger brain, in proportion to their body, as mice, squirrels, and some birds." Is not this tantamount to affirming that man *has* and *has not* "the largest brain of any animal?" For, if the proportion of the brain to the whole body be not understood, that organ will be found larger in many animals than in man. "We know so little," Mr. W. very properly adds, "of the physiology of the brain and nerves, that I shall not state much concerning them." Accordingly he contents himself with reinforcing what Mr. John Hunter has remarked respecting the large brain in man and in the elephant, by the authority of Lavater!

Reason, *speech*, and *language*, agreeably to *our author*'s method, are next considered; but, as these are the most important points of distinction between man and other animals, and

* Travels and Voyages through Europe, Asia, and Africa, eleventh edition, Edin. 1770. p. 411.

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do not, perhaps, so properly fall within the province of the physiologist as of the moral philosopher, we shall now proceed to our author's next article, namely:

Parturition. Our author needed not to have taken the trouble to consult nine travellers, whom he names, to prove, that the women in all tropical climates experience easier labours than those of Europe; for we admit the fact, partly from our own knowledge; and we also agree with our author, that the same fact extends to the women of Livonia and the Indians of N. America, and probably from the same cause, namely, "their living nearly in a state of nature." This cause our author combines with the smaller heads of the children, and the larger pelvises of the mothers. But may not these last, if true, be themselves considered as effects of their simple mode of life? Cows kept in London, (our author well observes, with Dr. Bland,) upon gross food, with little exercise, have more difficult labours than those in the country. We are disposed to lay the more stress upon this analogy, as difficult labours rarely occur among the women of any country who are accustomed to simple food and moderate labour in the open air.

Mr. W. next proceeds to the diseases which are supposed to be peculiar to the negroes, and which he describes with great candour. The locked-jaw, he observes, is not peculiar to the negroes; but affects Europeans, even in their own climes, and more frequently in the torrid zone. Dr. Moseley, as quoted by our author, says, "that the negroes, who never see this accident happen to white children, nor any others *who have proper care taken of them,* if born healthy, attribute it to witchcraft." The word "never," in this quotation, is abundantly too strong.

Mr. W. goes on to observe, that "European women, in hot countries, are very subject to floodings and the fluor albus; and that negresses are almost exempt from both these complaints, but are very liable to obstructions of the menses." But these differences are plainly produced by different modes of living. European women, in tropical countries, can scarcely be said to have any exercise at all; whereas, it is well known, that the negresses, at least in the West Indies, lead very laborious lives, exposed to the full blaze of a vertical sun in the dry season of the year, and to sudden and chilling rains after intense sunshine in the wet season; not to mention their own imprudence in bathing in cold water at improper times. We have said in the West Indies, because, though Mr. W. cites no authority in this instance, he frequently refers us to the statements

statements of the West India planters. Those gentlemen can also tell him, that the gonorrhœa simplex (even if it were, as it is not, " a very common complaint among the negro men, when there is not the least suspicion of any venereal taint") might be accounted for by their straining exertions in the course of their labour. It seems at least certain, that these exertions sometimes occasion ruptures*.

The author next relates, from the Philosophical Transactions, vol. liv. p. 386, that in 1763, " in the island of Nantucket, there were three hundred and fifty-eight Indians, when a sickness broke out, which, in about six months, seized two hundred and fifty-eight of them, of whom only thirty-six recovered. Of the hundred that escaped, thirty-four were with the sick, eight separate, eighteen at sea, and forty in English families. It was particularly remarkable, that although the English inhabitants were much more numerous, not one of them had the sickness." Our author calls this a " convincing proof, that the Indians in North America are subject to fatal diseases, which do not affect white people." To us, however, it is a " convincing proof" that we ought, as in the last cases, to look for the cause in the very different modes of life of the two descriptions of people; for, of the forty Indians *in English families*, it is acknowledged that *not one* had the sickness. The fact is, that the English families in Nantucket are almost all industrious Quakers, who live in the plentiful English manner; whereas the Indians live " much more simply †;" or, as we would say, live poorly; and seldom miss an opportunity of debauching with Yankey rum.

From the quotations which our author has given from Dr. John Hunter, (formerly of Jamaica,) nothing can be concluded; for that respectable physician expressly says, " the diseases of the negroes seldom fell under my observation. What I have to say of them, therefore, will be very short; and chiefly with a view of calling the attention of others to the subject ‡." Our author shews his candour more than his conclusive reasoning, by quoting these words.

The general exemption of the negroes from the fevers which proved fatal to so many of our brave fellows at Fort St. Juan, is accurately stated by Mr. W. from the same authority. We say accurately, having been assured of the fact by the late

* Suppl. to the Privy Council's Report, p. 30.

† Hist. of the Brit. Settl. in North America, by W. Douglas, M. D. vol. ii. p. 349.

‡ Diseases of the Army in Jamaica, p. 305.

Colonel

Colonel Dalrymple, who commanded on that unfortunate expedition. But do this and similar facts prove more, than that the negroes stand exposure to their *native* climate better than the *exotic* whites? If we rightly remember, Bishop Burnet, in his History of his own Times, tells us, that when his countrymen first took the field in the civil wars, they chiefly subsisted on the oatmeal in their knapsacks, which they mixed with cold water*. And it is certain, that many of the Highlanders, who drive cattle to England, still use the same frugal diet; thus, and by their well-known valour, proving themselves to be worthy descendants of warriors, who taught Agricola in the very centre of his camp, "What sort of men Caledonia had reserved for her defence †." Those men live, in a great measure, on a mixture of oatmeal and cold water, called *crowdy*, travel all day, and, where they have not the benefit of enclosures, watch the cattle by turns at night, exposed to every vicissitude of the weather, in the months of October and November. Now, if this sort of life should prove fatal (as there is little doubt that it generally would) to the present inhabitants of England, and even of the lowlands of Scotland, would it not be absurd to bring this as a proof of what Mr. W. calls "an original difference of constitution" in the Highlanders and their near or immediate neighbours, the English or lowland Scotch? And is it not still more absurd to have recourse to this sort of reasoning, when Europeans are found to sicken and die in the "torrid climes" of the Indies, which, though fatal to *them*, may be perfectly salubrious to their native inhabitants?

Dr. Lining, as quoted by Mr. W. says, that "though many of the negroes were as much exposed as the nurses to the infection of the yellow fever which prevailed in South Carolina, yet he never knew an instance of this fever among them, though they are equally subject with the white people to the bilious fever." Mr. Carey, however, our author candidly adds, after relating the above, observes, that "the same idea prevailed, for a considerable time, in Philadelphia; but it was erroneous. They did not escape the disorder; however, the number of them that was seized with it was not great; but as I am informed by an eminent doctor, it yielded to the power

* Is not the military word *haver-sack* a proof that such was anciently the practice? In some parts of the North, oatmeal is still called *haver-meal*. (*Qu.* from *avena?*)

† "Quales sibi viros Caledonia seposuit." TACIT.

of medicine in them more easily than in the whites *." This account of Mr. Carey's very much weakens the inference which might otherwise be drawn from that of Dr. Lining; especially when we consider (what every account ought to include) the widely different, not to say opposite, modes of life, which, speaking generally, it is the lot of the blacks and whites to experience. In Carolina, most of the whites live in ease and comfort; many of them, indeed, in a manner uncommonly luxurious; whereas most of the negroes are subjected to constant hard labour, and are too often pinched even in necessaries. In Pennsylvania, the negroes, thirty years ago, did not amount to one fortieth part of the inhabitants; and at present their proportion is still less; and though they experience much better treatment than in South Carolina †, yet we suspect that even there they are not treated quite so well as the whites; for we have been told by a respectable clergyman of the church of England, a native of Pennsylvania, but now established in this country, that in his time, (fifteen or sixteen years ago,) "when any disagreeable job occurred in a family where there was a negro, *blackie* was generally ordered to do it."

Upon the whole, it appears to us that Mr. W. has adduced no facts, on the subject of diseases, which can in the least degree justify the conclusion he attempts to draw from them. Those facts may well be accounted for from circumstances in the very different conditions of negroes and whites, too seldom noticed indeed, but which are essential to the formation of an accurate judgment in the present case. If the disease which formerly prevailed under the name of the *sweating sickness* was in fact exclusively confined to Englishmen, who can doubt, for a moment, that it was caused by some peculiarities in their mode of living?

As to the *lousy* argument quoted by our author from Mr. Long, it is certain, that the insects bred on negroes are of a darker hue than those which infest whites; but that they are larger we deny, from our own disagreeable experience of the *colonists*, which used to pay us occasional visits along with our black barber and taylor. And (we ask for information) are not the lice on black hogs darker than those on white ones? Is not the breed propagated on very brown human skins in this country,

* Account of the malignant Fever at Philadelphia, p. 78.

† These facts are stated by the intelligent Mr. Wynne, in his Gen. Hist. of the Br. Emp. in Amer. printed in 1770; vol. i. p. 226, and vol. ii. p. 289, 541, 543.

country, darker than those which *pasture* on very white skins? Are not those of the head and body of the same individual, of different varieties? "Brisk as a *body*-louse," is one of Swift's *elegant* comparisons, in his New Song of New Similes; and that author seems to have been well skilled in this part of natural history. We seriously think that these queries are not unworthy the attention of entomologists.

"The Africans' manner of walking is very different from that of the European, and very much resembles that of the ape." So says Mr. W. on his own authority alone; and, as he has not stated the observations on which he founds this comparison, or the part of the world in which he made those observations, we can only say that the fact is new to us. Some men, however, are more expert than others in making minute discriminations. We have heard a person affirm, that, let a taylor disguise himself in any dress he pleased, he could distinguish him by his gait. If he had said the same of a London drayman, we should have had less difficulty in believing him.

Mr. W. proceeds to notice "those respects in which the brutes excel mankind, and the African the European;" namely, *seeing*, *hearing*, *smelling*, *memory*, and *mastication*. He observes, that Calmucks and negroes possess the senses of seeing, hearing, and smelling, in greater perfection than Europeans. But as Calmucks and negroes possess this superiority in common with all, or most other uncivilized men, and, we may add, all, or most wild animals, compared with tame ones, Mr. W.'s "approaches of those tribes to the brute species" can receive no support from such superiority. He here quotes Dr. Pallas as observing, "that the Calmucks hear at a great distance the trampling of horses, the noise of an enemy, of a flock of sheep, or even of strayed cattle; they have only to stretch themselves on the ground, and to apply their ear close to the turf." Mr. W. should have told us from what part of Dr. Pallas's voluminous works he took this passage; for, by his manner of introducing it, he seems to insinuate, that that learned writer was ignorant of the well-known practice of European soldiers, in stretching themselves on the ground to listen for the sound of the footsteps of approaching enemies. Dr. Franklin tells us, that, by this means, he heard the blow of two stones struck together, at the distance of near a mile, smart and strong, as if close at the ear *.

* Experiments and Observations, p. 445. Some curious analogous facts may be seen in DERHAM'S Phys. Theol. p. 134; MUSCHENBROEK, Elem. Phys. § 1150; and the Journ. de Phys. as quoted in the Annals of Philosophy for 1800, p. 43.

"Negroes," says Mr. W. "have stronger powers of mastication than Europeans, and most quadrupeds have them still stronger." The ancient Egyptians had stronger powers, or, at least, stronger instruments, of mastication than the negroes. Dr. Blumenbach (p. 224) mentions six mummies, in which the incisive and the canine teeth were not distinguishable, except by situation, from the maxillaries. He himself examined three of those mummies, one of them belonging to Mr. Symmons, and which is described in the Philosophical Transactions for 1794. That excellent physiologist also says, that he has lately received from Labrador two skulls of Esquimaux Indians, in which the teeth answer the same description. In short, Winslow long ago observed the like conformation in the teeth of the Greenlanders. Now the skulls belonging to the mummies probably once contained a great deal of what the Scriptures call, by way of eminence, "the wisdom of the Egyptians;" who, it is well known, communicated that wisdom to the Greeks themselves. On the other hand, the Esquimaux and Greenlanders are very barbarous tribes; and therefore, if this observation of Mr. W. be as just as it appears to be original, the Egyptian was as much of a brute as the Esquimaux, and the Negro superior to both!

"It is said," observes Mr. W. "that negroes excel Europeans in memory; but those domestic animals with which we are best acquainted, as the horse and the dog, excel the human species in this faculty." As these facts appear to be new, we are not well prepared for making observations upon them. The only instance of great memory in a negro which we can now recollect, is that of the famous Job ben Solomon, who was said to be able to repeat the whole Alcoran with great exactness *. Perhaps our author could not produce a *greater* proof of memory in a dog or a horse! We might quote instances of still stronger retentive powers, particularly from Derham, who mentions the almost incredible memories of Seneca, Latro Portius, Cyneas, Cyrus, L. Scipio, Mithridates, and Carneades †. But perhaps not one of these instances is more astonishing than that of Dr. Wallis, the celebrated mathematician, who tells us, among other proofs of his extraordinary memory, that, at the request of a foreign gentleman, he extracted the square root of a number consisting of fifty-three

* If we mistake not, we read this in MOORE's Travels in Africa: we certainly have read it somewhere; perhaps in the Annual Register, which contains an account of that excellent negro.

† Physico-Theology, p. 265, edit. 3.

figures,

figures, to twenty-seven places, by night in bed, and dictated the whole to the gentleman the next morning *. These instances may suffice to shew, with how little reason our author would apply to the negroes the common but groundless saying, that a strong memory indicates a weak understanding †.

Our author lays so much stress "on hair," as to have made this the title of "the third part," or general division of his work. We by no means attach so much importance to that excrescence; and if we did, our limits would not allow us to expatiate so much as we might, on this long and learned dissertation.

Our author carries the analogy between hairs and vegetables so far, as to call the hair which forms the coat of animals an *annual*, and that on the human head a *perennial*; a distinction, we own, not without foundation; but what he observes on the quick growth of the hair of animals in winter, we suppose, he does mean to be applied to climates where there is no winter, and consequently animals have no winter coat.

"On the other hand," our author observes, "that in European whites, the hair of the head attains a greater length in warm climates than in *cold* ones. Agreeably to this remark, it will be found to grow both longer and thicker in Greece, Italy, and Turkey, than in France; in France more so than in England; and in England more so than in the more northern parts of Europe."

These general, *sweeping* assertions should always be supported by a suitable train of observations. But Mr. W. in this, as in many similar cases, has given us no authority of any kind; and we believe that the exceptions to this general rule will be found at least as numerous as the examples. The hair of the Spaniards and Portuguese, in particular, never appeared to us, in general, longer than that of the inhabitants of this island, or even of Denmark and Sweden. But we except the effects of artificial means.

"In France," says our author, "*where they are desirous* of having a great quantity of long hair, they sleep with much covering on their heads, and use much powder and pomatum, which defend it from the cold. These means seldom fail to

* Lowthorp's Abridg. of the Phil. Trans. vol. iii. p. 661.

† "Thus in the soul, while memory prevails,
The solid power of understanding fails."

"To represent strength of memory as incompatible with solidity of understanding is obviously contrary to fact," &c. *Letters from a Father to his Son*, by J. AIKIN, M. D. vol. i. p. 157.

produce the *desired* effect. Excess of heat is said to be prejudicial to the growth of hair; but this does not appear to be the fact; for negroes in the burning sands of Africa have hair as long, or longer, than the natives about the Cape of Good Hope in the temperate zone; whose hair, notwithstanding they use much grease, is so short and woolly as to be compared to the nap upon cloth."

Without mentioning that our author has here forgotten the obvious distinction between *animal* and *solar* heat, we may observe, that this same heat has the curious property of lengthening European hair, and stunting African, in the northern hemisphere, and has opposite effects on African hair in the southern. It seems rather curious too, that grease should elongate a Frenchman's hair, and have no such effect on that of a Hottentot. But there is much in imagination; perhaps the Hottentot *petit maitres* do not *desire* it. Would it have been amiss, if our author had adduced some authority for these facts?

"The hairs," says Mr. W. "upon the breast and legs of Europeans grow much larger and faster under the torrid zone than in a temperate climate. Negroes, it is observable, have no hair upon their breasts or legs." Mr. W. gives no authority whatever for these assertions, and they are perfectly contrary to our own observation. But what would he infer from them, even if true? Though Jacob and Esau were not only brothers but twins, the one was "a hairy man, and the other a smooth man *;" and, from their time to the present, similar instances have occurred.

"The natural curl of the hair," says Mr. W. "cannot be owing to the warmth of the climate, as has been asserted by some authors; for there are more among the Europeans who have curled hair, than among the natives of South America, whose hair indeed is usually straight and lank." Our author might have extended the same observation to the Anglo-Americans, settled in the northern part of the same continent; for it is very well known, that "curled locks, so frequent among their ancestors, are rare in the United States †." Nay, the observation, like that upon hairy and smooth skins, might be extended to persons of near consanguinity, and even to the

* See Gen. ch. xxv. ver. 25. and ch. xxvii. ver. 11.

† See An Essay on the Causes of the Variety of Complexion and Figure in the human Species, by Dr. S. S. Smith; printed at Philadelphia in 1787; reprinted at Edinburgh in 1788, with additional notes by a gentleman of the university.

children

children of the same parents, some of whom have curled, and others lank hair. There are also families, consisting chiefly of *crispi*, in this country. We know more than one family, several individuals of which it would not be easy to distinguish from negroes by their hair alone; though there be not a shadow of reason to suspect the remotest connexion with the negro race.

Our author quotes BUFFON and the Sierra Leone Directors * as affirming, that European sheep, carried to tropical countries, exchange their wool for hair. On the other hand, he refers to Dr. WRIGHT, who, it seems, asserts that, in Jamaica, "English sheep carry the same kind of burly fleece that is common in England." The Doctor should have mentioned in what *climate* of Jamaica he met with these same "burly fleeces;" whether on flocks panting with heat in the low lands, or shivering with cold among the Blue Mountains, some of which are 7,430 feet above the sea. At Kingston, the average heat is nearly 80° of Fahrenheit; whereas at Cold Spring, only fourteen miles from that town, but elevated nearly 4,200 feet above it, the mercury ranges from 44° to 65°; and blankets and fires are necessaries of life, for a great part of the year. Accordingly, in the latter situation, European sheep retain their wool; but in the former, are divested of it †.

Dr. Blumenbach, after noticing the prodigious variety in the covering of sheep, from the finest wool to the coarsest hair, extends the same observation to hogs and other *mammalia*. He contrasts the hair of the hog in its wild and domesticated states; and says, that in Normandy, the bristles of that animal are so flexible as not to be fit for brushes ‡.

We now leave Mr. W. to derive what advantage he may from his learned dissertation "on hair."

(To be continued.)

* See their Report of 1794, Append. That Appendix was drawn up, in a popular way, by our learned and accurate friend Dr. AFZELIUS of Upsal, who resided some years at Sierra Leone. It was hastily abridged and published by a person very imperfectly qualified for the task.

† See Edwards's Hist. of the W. Indies, vol. i. p. 184; Long's Hist. of Jamaica, vol. i. p. 130, 358, and vol. ii. p. 125, 512; Descrip. of the W. Indies, printed 1778 in 4to. p. 54. We might also refer to Ulloa's Voyage, from which we learn, that the Andes, though intersected by the Equator, exhibit every climate on the face of the globe.

‡ De Gen. hum. Var. nat. p. 77. The learned and ingenious author says, he has a specimen of red hair, which he clipped from the head of a mulatto man. Groben affirms, that he saw red-haired mulattoes in Africa; and Margraff, that he has seen an African woman whose hair and skin were both red. Id. p. 165, 169, where many similar facts are mentioned.

Art. II. *Observations on the Cow-pock.* By John Coakley Lettsom, M. & L. L. D. Member of several Academies and Literary Societies. Second Edition. Octavo. 88 pages. Mawman, London. 1801. Price 3*s*.

THE celebrity which Dr. Lettsom has obtained as a practical physician, attaches a considerable degree of importance to his sentiments, especially on subjects respecting which the judgment of extra-professional members of the community is to be influenced and directed. The present publication, therefore, announcing his decided approval of vaccine inoculation, may be considered as a valuable addition to the number of attestations which have already appeared in its favour.

As it does not seem to have been the author's design to communicate any new facts in the history of the disease, little original matter is to be expected in his work; the chief merit of which consists in its presenting a sufficiently comprehensive view of what has been ascertained upon the subject, enforcing with peculiar energy and zeal the arguments adduced in support of the practice, and replying with much ingenuity and acuteness to the objections which have been urged against it.

We have on former occasions given such ample extracts from the writings of those who have preceded Dr. Lettsom in describing the cow-pox, that it seems unnecessary to enter on a complete analysis of this little treatise. We shall therefore endeavour to select those passages which are most worthy of the attention of our readers, whether as being remarkable for justness of reasoning, novelty of idea, or singularity of style.

Of the first description we consider the following apology for the author's belief, that the cow-pox never has been, and never will be, fatal. "It has, indeed, been calculated, that, of sixty thousand persons who have been inoculated with the cow-pock, four have died. I cannot bring my imagination, from the experience I have had, to conceive, that any healthy subject can die of a process which can hardly be called a disease; or, in other words, that a single pustule (for there is rarely more) can prove fatal. Prejudice or ignorance have given rise to various reports, which inquiry has proved unfounded. It must, however, be acknowledged, that many mistakes have been committed by practitioners; matter has been taken from the chicken-pox *(varicellæ,)* and too frequently from the purulent fluid round the scab of the cow-pock, or in the variolous pustule; and in either case it is needless to say, inocu-

lation

lation under such circumstances is no security against the small-pox.

"But, supposing four might have died in sixty thousand persons inoculated by the cow-pock, it can hardly afford an argument against the practice; for if we calculate, that the process of the eruption, &c. may occupy fourteen days, who would ensure sixty thousand healthy persons for fourteen days, under the chance of no more than four dying in that period?"

Dr. Lettsom's opinion of the vast superiority of vaccine to variolous inoculation is thus happily, though somewhat fancifully, illustrated: "Condamine, in describing the superior safety of variolous inoculation, compared with the natural infection; represents the latter as a rapid river, which every individual is liable to pass over; and the former as a boat, which each may avail himself of, to ensure a safe passage; whilst those who do not embrace this conveyance must incur the risk of plunging into this dangerous current. If this allusion exhibit the superior advantages of variolous, may we not substitute an adamantine bridge in favour of vaccine inoculation?"

In the letter from the medical committee to the mayor of Paris respecting the cow-pox, the discovery of it is mentioned as the most brilliant and most important of the eighteenth century. Our author, however, thinks this sentiment inadequate to its magnitude, and considers it as the greatest discovery recorded in ancient or modern history, not excepting even the discoveries of "gunpowder, printing, the mariner's compass, or the circulation of the blood."

Dr. Lettsom addresses himself with great earnestness to the several descriptions of persons, whose situation enables them to promote the extension of vaccine inoculation. Those who, "under the designation of reviewers and critics," impose a tone upon public opinion, he exhorts to stand forward on this interesting occasion, not with "cold approbation, bordering upon indifference, if not apathy," but with the "impressive ardour" necessary for animating the multitude to self-preservation. "When Herschel fixed the site of the Georgium Sidus in the great volume of the heavens, you raised the theme of ardent praise to this unrivalled astronomer; but what is the Georgium Sidus, in competition with the Jennerian discovery! Has it conveyed to one human being a single ray of advantage? Contemplate with impartiality the latter, whose beneficent rays are destined to dissipate the gloomy atmosphere of pestilential mortality; whose fatal victims, I am bold to suggest, amount to two hundred and ten thousand annually in Europe alone? Does

Does this reflection admit of a coldness of description? Dip your pens in ætherial and indelible ink!—Impress your observations in characters legible to the most distant regions of the globe!"

If this energetic apostrophe fail to animate us, we are truly a sluggish race!

Pastors are next entreated to co-operate in forwarding this benign purpose, by inculcating the duties of self-preservation; and parents are exhorted to adopt, without hesitation, a process, by which their offspring may be enabled to escape "from the valley of the shadow of death."—"Mothers!—your infants cannot reason for themselves, but they call upon your protection, by every tender and winning gesture. How have you been delighted, when their playful hands instinctively press your bosoms, to solicit the flow of that nutritive fluid that *percolates* from your heart's blood, and adds to theirs! When they look up to you with smiling innocence, how ardently you press their lips with caresses and kisses! With ardour I invoke you to shield their endearing features with the *ægis* of Jenner."

Dr. Lettsom mentions with concern, but with more mildness than it deserves, the illiberal endeavours to bring the practice of vaccine inoculation into contempt, by applying to the disease the epithet "beastly," and branding its promoters as being possessed with the "cow-mania." The observations on the former points are much to the purpose, and in some measure, we believe, original. "Of the primary sources of infectious diseases, little is yet clearly ascertained; that some originated from animals is certain; but, of all animals, the cow is most congenial to the habits of man; its food is simple, and its diseases are few: we are from infancy nourished by its milk, and its flesh constitutes a large portion of human aliment; and surely a particle of matter extracted from this almost sacred animal, can excite no disgust, or rational idea of impurity, whilst that of man, too often the creature of appetite and morbid indulgence, with juices vitiated by intemperance, and a constitution injured by vice, may indeed afford some suspicion of contamination and impurity."

The author now proceeds to what is more properly the medical part of his treatise; describes the disease as it exists on the udder of the cow, and as it appears when excited by inoculation in the human subject; and gives directions for taking and preserving matter. With respect to the time of taking it, he inserts a letter from Dr. Jenner, which seems of considerable

able importance. "If inoculators would be attentive to this (which I lay down as a golden rule in vaccine inoculation,) *never to use the virus after the formation of the efflorescence around the pustule*, they never, or scarcely ever, would experience disappointment. I never, in any one instance, saw a pustule formed by the virus, taken in this early state of its formation, and transferred immediately to the skin of a person fully susceptible of its action, that was not properly characterized, in other words, that was spurious."

We recommend this precept to the serious attention of inoculators, as we believe that much of the discredit which has attached to vaccine inoculation, has proceeded from ignorance or disregard of the caution which it inculcates.

The advantages which might accrue from Dr. Jenner's discovery are thus estimated by Dr. Lettsom: "In London and its environs, there are about one million of inhabitants, of whom, three thousand die annually by the natural small-pox, or about thirty-six thousand in Great Britain and Ireland. The population that might result, from their preservation by the cow-pock, would probably re-people these kingdoms every century, or give existence to twelve millions of human beings! What a glorious reflection to my friend, who has been the means of preserving more lives than ever fell to the lot of any other human being!"

The rest of this pamphlet consists almost entirely of copies and extracts; it comprises an account of Dr. Woodville's journey to Paris—his remarks on vaccine inoculation, printed in the Medical and Physical Journal—the papers published by the Vaccine Institution—the Manchester Address to the Poor—the Resolutions of the Public Dispensary in Carey Street—and the history of the progress of vaccine inoculation on the American continent.

In conclusion, Dr. Lettsom considers the question, whether or not the variolous inoculation be now a justifiable practice. "Were parents," he observes, "previously informed of the probable proportion of deaths by variolous inoculation, and were it, like the vaccine, incapable of communicating infection to others, some apology might be admitted, and the old practice in a great measure justified; but, if we take into the balance, the dangerous influence of variolous inoculation, by spreading infection, and endangering the lives of those who have not had the small-pox, I can hardly consider a professional man justifiable in supporting this practice in the present period of experience."

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The author then adverts to an instance mentioned in Dr. Willan's Reports upon the Diseases of London, where, in consequence of the inoculation of one child, " seventeen persons were affected with the small-pox in the natural way, within a fortnight after the child's recovery; and *eight* of them died of the disease."

" What a dreadful mortality," continues Dr. Lettsom, " is here exhibited! Would not a medical practitioner at this period of improved knowledge be responsible for so fatal a catastrophe? Knowing the indubitable safety of the vaccine-pock, it would be his duty to place before the parents, who might solicit the variolous infection, the certainty of life on one hand, and the danger of death on the other; and if they refused to accept the former, he ought not to be accessory to the latter, by acting as the medium of diffusing the fatal poison, unless under very particular circumstances."

From the extracts which we have given, our readers will perceive that some parts of this little work are composed with a loftiness of style not very well suited to the simplicity of the subject. We cannot help wishing, indeed, that the respectable author had more uniformly avoided those rhetorical excursions, which are chiefly applicable when an advocate is conscious that he must not confide in the unbiassed reason of his judges, and desires, in some measure, to blind them by an impassioned appeal to their feelings. This, we think, is by no means necessary with respect to inoculation for the cow-pox; for we are convinced, that if the public be not misled by want of caution, or by injudicious zeal on the part of those who patronize and practise it, its universal adoption will result from a dispassionate consideration of the evils which may be counteracted by its means.

We observe that Dr. Lettsom, through his whole book, whether mentioning the disease himself, or quoting from others, uses the term " cow-po*ck*." As far as some others are concerned, this is certainly a liberty by no means warrantable; and we confess ourselves unable to assign one good reason for preferring this expression to the original term " cow-po*x*." It may indeed be pretended, that as " pock" means " a pustule," and as only one pustule generally appears in the vaccine disease, it is more correct to use the singular than the plural noun. This, however, seems a very insufficient apology: we are to give a name to the disease, not to a symptom of it; and if we are to adopt Dr. Lettsom's mode of expression, (which we believe to be that of the Vaccine Institution,)

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we must, to be consistent with ourselves, recur to the original orthography of "small *pocks*," and even then we shall only express a symptom of variola. But, we may ask, is "pox" a plural noun? No one, we apprehend, will assert that it is now ever used as such; and if so, all attempt at innovation, on the pretence of correctness, must at once be given up.

But perhaps "cow-pox" is rejected, because the latter syllable being the vulgar name of an obscene disease, the use of the term may be expected to give rise to impure ideas. If this consideration had any weight in inducing the change of the original name, we are persuaded that the apprehension is wholly chimerical, as we have no doubt that the term "small-pox" is perpetually used, without the most distant recollection of its having any thing in common with the name of the other disease alluded to. Nay, we do not hesitate to assert, that if it be desirable to avoid any impure association of ideas, this object will be much more effectually secured by an observance of the customary mode of expression.

We would not tire our readers with what may be thought of less importance than it appears to us; but we cannot dismiss the subject without noticing the ridiculous affectation, to which alone we can attribute the name given to the vaccine disease on the other side of the Atlantic. The substitution of kine-pox for cow-pox does not seem justifiable on any plea of superior correctness or utility; and it appears difficult to assign any other cause for its invention, than a love of singularity. If any one, following Dr. Waterhouse's example, should prefer to the usual terms, the expressions of *teeth*-brush, *feet*-stool, *mice*-trap, or *geese*berries, we should immediately remark the absurdity of the innovation: yet all those words have an advantage over *kine*-pox, in not being compounded with obsolete plurals. The analogy of the term "*swine*-pox" cannot be adduced in justification of the change to which we object, unless it can be demonstrated that the disease, now called by that title, was originally denominated *sow*-pox. We have heard it surmised, that the name was originally assigned for the purpose of introducing a pun upon the word, (*kind*-pox:) if this be true, we take the liberty of intimating to the ingenious *name-maker*, that as his reputation has now received all the additional lustre, which this display of wit can procure for it, he may, without any sacrifice in that respect, evince his candour and good sense by conforming to a more usual mode of phraseology.

 Dr.

Dr. Lettsom's pamphlet contains engraved likenesses of Dr. Jenner, Dr. Woodville, Dr. Pearson, Prof. Waterhouse, together with a representation of the "cow under its sacred character."

Art. III. *A compendious System of the Theory and Practice of modern Surgery, arranged in a new nosological and systematic Method, different from any yet attempted in Surgery, in the Form of a Dialogue.* By Hugh Munro, Surgeon; President of the Chirurgo-physical, and extraordinary Member of the American physical Societies of Edinburgh. The second Edition, corrected and improved. Octavo. 344 pages. Richardsons, London. 1800. Price 7*s.* boards.

As the author professes to give, in the work before us, an entirely new nosology and systematical arrangement of surgery, it is but reasonable to give his own words, in justification of this departure from the usual track followed by writers on this branch of the healing art.

After a short and handsome dedication to Professor Monro, the author begins in the Preface with observing that "It is somewhat surprising, that amongst the many systems of surgery, that have made their appearance in the world, so very few have been attempted to be arranged into a systematic order of classification. This defect seems to have proceeded either from an opinion, that no such arrangement was necessary, or from the idea, that it was impracticable, in this branch of science at least.

"That the former of these opinions is erroneous, will be readily granted by every person, who reflects for a moment on the great advantages of order and method in other branches of science; by which not only much circumlocution and trifling tautology are avoided, but the principles of the science itself more easily, as well as more firmly, impressed upon the mind of the student; who without these is apt to be disgusted, at the maze of confusion in which he is otherwise unavoidably involved. And the latter idea is equally groundless, from the excellent attempts that have been made towards a methodical arrangement of those diseases that fall properly under the care of the surgeon, by the celebrated Sagar and Sauvages."

He then continues to observe, that the discoveries and improvements of modern surgery have been so numerous and important,

important, as to render necessary some alteration in the former arrangements; a task which he has attempted in the work here submitted to the public eye.

We must confess, that we by no means see in the strong light in which it strikes the author, the necessity of a full nosological arrangement of the various diseases which belong to the province of surgery. It has always been acknowledged to be a valuable advantage in favour of the practitioners of this branch of science, both that the diseases which come under the peculiar province of the surgeon, and the means of cure which are indicated, are more obvious to the senses, in general simpler in their cause, and attended with less of that harassing perplexity, which it is so often the lot of the ablest physician to suffer. The author observes, that much circumlocution and tautology are avoided by nosological arrangement. This is undoubtedly true, within a certain latitude; but we do not think that it will be found, that writers on surgery have been apt to fall into these errors, except they themselves have been deficient in that talent of comprehension, method, and perspicuity, which are absolutely requisite to every writer on any general system, to go through his labours with credit to himself.

We shall not, however, detain the reader any longer on this subject, but proceed with a sketch of the author's nosology; this he gives in a clear, concise, and very intelligible manner, in a general outline, which occupies the first eight pages, and to which is annexed a *Clavis Classium*, exhibiting the whole in a condensed form in a folding sheet.

The author adopts three general classes, consisting of TUMORES, defined to be "when the size of any part of the animal body is increased by any cause beyond the natural state;" APOCENOSES, defined "morbid discharges of any kind of fluid from the body in greater quantity, or oftener than usual;" and VITIA, defined "faults arising from a change in the habit, number, order, or other qualities of the solids, appearing on the surface of the body, so as to be visible to the eye, or internally impairing the general health, occasioning deformity, and sometimes attended with death."

The latter phrase is certainly introduced with very little propriety as a specific distinction, as it applies equally to the preceding classes, and apparently with neither more nor less discrimination.

The class Tumores is again subdivided into four orders and fourteen genera; the class Apocenoses into three orders and eight

eight genera; and the class Vitia into three orders and eleven genera.

It certainly must be acknowledged, that thirty-two genera is by no means an unreasonable number to include all the species and varieties which belong to a complete nosology of surgery. The definitions which are annexed to each (which are all in English, we suppose for the accommodation of the class of readers for which they are adapted) are, with some exceptions, concise and perspicuous. The following may serve as examples:

"ENCYSTIS. Tumours completely surrounded with a covering or cyst."

"HERNIA. Tumours, occasioned by a displacement of some parts of the bowels through some of the outlet passages of the abdomen, and covered with a partial cyst of the peritoneum."

Perhaps the *hernia congenita* might a little militate against the accuracy of the last clause, as having no *proper* peritoneal cyst.

"ULCUS. Discharges of various kinds of matter different from blood, from old wounds, &c."

This, we must confess, is a very confused and inelegant definition; and the term *et cetera* is one of the last we should have expected in a definition of itself so meagre.

We shall now proceed to the more important part of the work, the actual description of the several diseases belonging to surgery, their cause, and the best method of cure. This part, which probably is the first which will attract the attention of the younger student, commences at the ninth page, and occupies the remainder of the volume. It is couched in the form of question and answer, for the use of which the author gives, in the Preface, the following reasons:

"And in order to impress them the more easily upon the memory, and render them familiar to the student, they are thrown into the form of dialogue, or rather catechism, by which young surgeons, for whose improvement this work is chiefly intended, may be enabled mutually to catechise and instruct each other.

"The advantages arising from such exercises have been already in some degree experienced, and known to be attended with the best effects. In a society lately instituted at Edinburgh, under the title of the *Chirurgo-Physical*, besides two papers on medical subjects, a *chirurgical question* is discussed at every meeting, to the great improvement of its members; several

several of whom, now practising in different parts of the globe, have acknowledged, that they have received more instruction from the discussion of these questions, than from the solitary perusal of whole volumes.

"This form of question and answer renders the work also a very proper companion for such as mean to be examined at Surgeons' Hall, or before any of the senior surgeons, by qualifying them to give distinct and proper answers upon every subject in surgery."

We do not entirely see the superior utility of this method of dialogue, as the questions that occur must follow a regular routine, and afford none of the advantages of argument. The questions, "What is a hydrocele?"—"What are the diagnostic symptoms of hydrocele?"—"In what manner does hydrocele begin and terminate?" &c. &c. do not appear in any way superior to the common method of dividing narrative description into these several heads; and the space occupied by the former is much greater, which, in a very scanty compendium of a copious subject, is a point of some consequence.

The author appears to have taken considerable pains in bestowing on each subject its proportional share of notice; and in this we think he has succeeded happily. He adopts the orders of his nosology as general titles, dividing the work into as many sections.

The first is that of Acute Tumours, which includes Phlegmon, Erysipelas, and a variety of local inflammations. In describing the operation of blood-letting, the author requires that the surgeon, as well as the patient, *should be seated.* We know he has authority for this injunction; and we think it a proper one, though the contrary is the constant practice.

The following account of Phrenitis we shall give as a fair specimen of the execution of this part of the work:

"PHRENITIS.

"INFLAMMATION OF THE BRAIN.

"Q. 32. *What is a Phrenitis?*

"A. It is an inflamed state of the brain or its membranes, attended with exquisite pain, inability to bear the impressions of light and sound, and for the most part accompanied by delirium.

"Q. 33. *What are the causes of Phrenitis?*

"A. External violence, though not attended with a fracture of the bones of the cranium, may be a cause merely by the commotion or concussion irritating it to such a degree as to promote

promote inflammation. Portions of the cranium beat in upon the dura mater, concussions attended with simple fracture, though not attended with a depression of the bone, yet the admission of the air through the fissure may be a cause of inflammation, where a plethoric state of the system prevails, that alone may be a cause of Phrenitis. Poisons taken into the system have also this effect.

" Q. 34. *In what manner is Inflammation of the Brain distinguished from concussion or compression of the brain?*

" A. In an inflammation of the brain the pupils are not dilated, and they are very sensible to the impressions of light. The pulse is firm and hard from the first. It is particularly distinguished from concussion in its not appearing until some time after the accident; whereas in concussion the symptoms occur immediately upon the injury being inflicted. In some cases the inflammation occurs the second or third day after the accident, while at other times it does not occur for several weeks, when the patient appears dull and stupid, nausea soon takes place, he is disturbed in his sleep, the face is flushed, and the eyes are somewhat inflamed. If a wound is present on the cranium, an erysipelatous appearance spreads around it; towards the latter end of the affection subsultus tendinum takes place, together with other convulsive affections, an involuntary discharge of urine and fæces follows, and death at last closes the scene. When these symptoms take place without any external injury being the cause, the nature of the complaint is easily distinguished from compression.

" Q. 35. *How is Phrenitis to be cured?*

" A. The same mode of treatment recommended for inflammation in general is also proper in a cure of Phrenitis. A strict antiphlogistic regimen is to be observed, by extracting blood in such quantities, and at proper intervals, as the system can bear, from the jugular veins, and by leeches applied to the temples. Cathartics, as they determine the blood from the head, are exceedingly proper. With the same view pediluvium may be successfully used. The application of cooling saturnine poultices to the part, or vinegar rubbed on the head, has been found to be of some service. A large blister laid over the head, in many cases, has been found to be of the utmost advantage."

We were a little surprised, however, to find *phrenitis* brought in as a species of the class Tumores; and we think the author would find it difficult to prove an increase of size in the brain, or any of the contents of the cranium.

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The order, Encysted Tumours, contains, abscesses, or collections of pus, in various parts; dropsies, or collections of water; aneurism and other collections of blood; and atheroma, with the other more indolent tumours.

The following is the author's description of lumbar abscess:

"ABSCESSUS LUMBARIS.

"*Syn.* Lumbar Abscess.

"Q. 53. *How is a lumbar Abscess distinguished?*

"A. As these abscesses are generally formed on the anterior part of the os sacrum, they may be sometimes mistaken for lumbago, and at other times they have a strong resemblance to nephritic affections. No discolouration of integuments takes place for the most part; however, fluctuation of matter is generally perceived. The contents of the tumour sometimes get down behind the peritoneum, and point outwardly towards the anus. By its getting down along with the great blood-vessels, below Poupart's ligament, it assumes the appearance of crural hernia; but may be easily distinguished from it, by no symptom accompanying hernia taking place.

"Q. 54. *How is a lumbar Abscess to be treated?*

"A. By the same remedies recommended for abscess in general; by emptying the tumour *by free incisions*, and by the frequent use of mild astringent injections; but the discharge is commonly so enormous, and the hectic fever so violent, that the patient, in most cases, falls a victim to the disease, notwithstanding the most vigorous exertions of art."

We cannot but remark the phrase, "emptying the tumour *by free incisions*," to be highly unguarded. The author surely cannot be ignorant, that it is considered as a point of great difficulty to determine the time when these abscesses are to be opened; and that it has been thought a considerable improvement to discharge the matter, and by carefully excluding the external air, to heal the wound by the first intention.

In the radical cure for the hydrocele, the author decidedly prefers the method of incision; which operation he thus describes: "Various methods have been proposed and recommended for exciting a certain degree of inflammation in the tunica vaginalis of the testicle, such as the application of caustic, the introduction of a seton, throwing in air and acrid injections, and making an incision by the knife, so as to admit the cool air freely into the cavity of the tunica vaginalis. The latter method is generally preferred. It is executed by making

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an incision with a round-edged scapel through the integuments from the top to the bottom of the tumour. Then, with a lancet, an incision is to be made in the tunica vaginalis of the testicle, large enough to allow the finger to be introduced, which now serves as a directory for conducting a ſtraight probe-pointed scapel, with which an opening is to be made, by dividing the superior part of the tunica vaginalis. Then the opening is to be extended downwards to the most inferior point of the tumour, unless the skin be much thickened. There is no occasion for removing any portion of it. The state of the testicle is to be immediately examined, and, if it is sound, it is to be instantly covered and defended from the air, and a piece of soft lint introduced between the lips of the wound, so as to produce a proper degree of inflammation. But when the inflammation runs too high, it is to be moderated by blood-letting, and the other parts of the antiphlogistic regimen, applying, at the same time, warm emollient poultices over the part to favour a plentiful suppuration, which is always necessary for the cure. The patient is to be confined to bed until the swelling subsides, which will generally happen in a few days. In this manner a cure is, for the most part, obtained in the course of five or six weeks. When both sides of the scrotum are affected at the same time, the first side is to be allowed to heal before a cure is to be attempted on the other, as the danger attending the operation arises from the extent of surface exposed to inflame. Dr. Monro has found, that the most successful time for executing this operation is to attempt it very soon after the palliative method has been once executed, before it begins to increase again. In this stage, the extent of surface exposed to inflame is much less, and the danger attending the operation more inconsiderable."

We think, however, that he might have added with propriety the method of injection, and mentioned the advantage which it possesses of being much less severe, an advantage which is surely of no small moment.

The third order which the author gives us, is that of Tumours from displacement. This contains all the species of Hernia, Prolapsus, and Luxations; including, therefore, some of the most important and difficult cases in surgery. The symptoms and cure of strangulated hernia are thus described:

"Q. 141. *What are the symptoms of strangulated Hernia?*

"A. An elastic colourless swelling is always discovered in the part affected. Nausea and vomiting generally take place, and the patient is hot and restless. No discharge is procured by

by stool after these symptoms have continued for some time. A distressing convulsive hiccup ensues, when all of a sudden the rest of the symptoms disappear, which sometimes will lead the patient to imagine that he is recovering; but when this occurs, it is a sign of approaching death. The pulse now becomes slow and interrupted; a cold sweat covers the extremities, the swelling and hardness of the abdomen subside, the eyes acquire a kind of languor, and the integuments of the abdomen a livid colour. A kind of crackling noise, like a dried bladder, is felt all over the body. The protruded parts are now returned with ease. At last subsultus tendinum occurs, and death closes the scene.

" Q. 142. *How is a cure of the strangulated Hernia to be treated?*

" A. By attempting to reduce the bowels as soon as possible. In executing this, it must be always observed, that the parts last protruded must be first reduced. The patient is to be laid in a horizontal posture, and the protruded parts reduced by the finger of the surgeon pressing gently in the direction of the opening, while with the other hand he supports the tumour. When the surgeon fails to reduce it in this way, the posture of the patient is to be changed; he is to be raised on his head and shaken. The bowels have been sometimes reduced in this manner. Several remedies have been recommended, to remove the stricture at the openings in the rings of the abdominal muscles, in order to facilitate the reduction, from an opinion that this constriction was of a spasmodic nature. With this view blood-letting has been recommended. Little can be, however, expected from its antispasmodic effects upon the tendinous rings of the muscles. It may be of some service in diminishing the contents of the tumour, and in producing a deliquium animi. By extracting a quantity of blood as quickly as possible, and suddenly relaxing the ligature, a deliquium animi may be produced, particularly if the patient be kept in an erect posture. In this manner a reduction was effected often after every other method had failed. Some have recommended warm poultices to be applied to the part, to relax the constriction; but this method can never be with propriety attempted, as heat always tends to increase the size of the tumour, and of consequence to render the reduction more difficult. Some recommend the application of cold and snow to the part, in order to diminish the size of the tumour. Stimulant purgatives may have some effect in producing a reduction, and in removing costiveness. Stimulant injections

are, however, found to answer best; such as tobacco smoke. Opium injected by the anus is sometimes attended with good effects. When, notwithstanding every attempt, a reduction cannot be accomplished, the only expedient left is to remove the constriction by a chirurgical operation."

If we were disposed to criticise minutely, we might fairly object to the term *stimulant* injections, as applied to tobacco smoke; for it would be difficult to prove one single stimulant effect arising from this most powerful but hazardous application, from the very first nausea to a complete recovery from the deathlike appearances which it occasions.

The fourth order is that of Chronic Tumours, including the several species of Scirrhus, Scrofula, Polypus, Exostosis, and several of smaller importance. He entirely and decidedly rejects the chance of cure or benefit in scirrho-cancerous diseases by any kind of medicines. The following are his words on the subject.

"Q. 192. *How is Scirrho-cancer to be treated?*

"A. No medicine has been as yet discovered that will cure this affection. Various remedies have been recommended, such as arsenic, cicuta, hyosciamus, and many others, which injure the constitution materially, and are attended with very little effect. The only method of cure is to remove the diseased parts completely by the knife, when it can be executed with propriety, and consistent with life; especially if the disease has not already made considerable progress, and if one part of the body only is affected. Removing a portion of the diseased parts seems to do an essential injury, as experience has discovered, that the admission of cool air into scirrhous swellings hastens very much their pernicious effects upon the system. No operation, therefore, for the removal of scirrhous tumours is to be attempted, except when the whole of the diseased parts can be removed."

We notice a considerable omission in the treatment of white swellings. All the author observes on this head is the following short paragraph:

"Q. 209. *How is White Swelling, from scrofula, to be treated?*

"A. No remedy has been yet discovered capable of curing scrofula, so that very little can be done for the cure of scrofulous swellings of the joints. Frictions with mercury upon the part are recommended. The application of emollient poultices to the joint becomes in certain cases necessary. After every attempt has been persevered in for some time, and the disease

disease still advances, the limb must be removed to preserve life."

The use of repeatedly blistering the part in the incipient state of this dreadful disorder is so well established, and the benefit derived from thence has been so often experienced, that it should on no account have been omitted.

The fifth order is Hæmorrhagies, including but very few genera. The general treatment of hæmorrhagy contains, of course, the use of the tourniquet needle, tenaculum, &c. But here too we have to notice the omission of prepared sponge, a substance which, though attended with some inconvenience from its use, has so powerful an effect in checking a flow of blood, that it stands among the very first of the genuine styptics. We do not wish to enumerate every omission, as we are aware of the very limited plan which the author has laid down to himself, and which we cannot but think lessens considerably the utility of a work, on the whole, executed with skill and attention.

The sixth order is that of Ulcer; this commences with Simple Ulcer, which the author defines "a discharge of mild pus from the surface of a wound, not of long standing; or from an abscess situated on the surface of the body, and having new granulations at its bottom."

The treatment of simple ulcers is sufficiently accurate; but we think, that along with the article of bandage, the excellent method introduced by Mr. Baynton might have been mentioned, as its value is now so fully ascertained, in cases which so often used to baffle the greatest surgical skill.

The operation for fistula in ano is thus described: "The patient being placed in a proper posture, the finger of the surgeon is to be rubbed over with oil, and introduced into the rectum: the point of a probe-pointed bistory is to be inserted into the fistula, and pushed against the finger in the rectum, if a communication take place between the finger and the rectum. When this, however, is not the case, and the fistula runs only in the direction of the rectum, a sharp-pointed bistory is to be used. A piece of cork, similar to the finger, is to be introduced into the rectum, to receive the point of the bistory after it has penetrated into the rectum. It is now to be taken out at the anus, withdrawing the cork at the same time, so that the surgeon may finish the operation by one stroke of the knife. A degree of inflammation being in this way produced, the callous edges are destroyed by the formation of pus on their surface; and, by gentle pressure, a cure is

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then generally obtained. When fistulæ are at a distance from the rectum, they are to be opened by a directory and a scalpel."

We think, that the author would very seldom find the use of cork resorted to in this part of the kingdom. An essential part of the cure, the introduction of lint, so as to compel the wound to heal from the bottom, and prevent the reproduction of fistula, is not mentioned.

The seventh order, of increased Secretions, contains very few genera. The principal in importance is the Gonorrhœa virulenta. As the whole of the author's observations upon it are contained in the following two short paragraphs, we suppose that he considers it too complicated a subject to come within his plan.

"Q. 290. *What is a Gonorrhœa virulenta?*

"A. By the term gonorrhœa virulenta is generally understood a discharge from the urethra of the male, and vagina of the female, occasioned by the venereal virus acting against the glands of the affected surface.

"Q. 291. *How is Gonorrhœa virulenta to be treated?*

"A. By removing the poison, as much as possible, by mild washes, or allowing it to disappear spontaneously, and palliating the symptoms by opiates, to allay the pain and chordee, and by oil or mucilage, to supply the place of mucus to the abraded surface of the vagina or urethra."

The eighth order, Loss of Continuity, contains the whole treatment of wounds of every description, of fractures, contusions, and burns.

We think, that the author has treated subjects of the simple, punctured, lacerated, and contused wound, with great clearness and accuracy, as indeed it well merits, from the great importance and the superior frequency of these over the other surgical cases. The following is the account which our author gives us of amputation:

"Q. 321. *How is Amputation above the knee joint to be performed?*

"A. After laying the patient in a horizontal posture, on a proper table, or bed, a cushion is to be laid on the course of the femoral artery, above which the strap of the tourniquet is to be applied, a few inches above the part where the first incision is intended to be made. An assistant is now to sit on a low seat before the patient, and to lay hold of the limb, while another pulls up the integuments. The surgeon now, standing on the outside of the patient, is, with one sweep of the

the knife, to divide the greatest part of the integuments; with a second sweep, which should be a continuation of the first, he is to complete the circle. As soon as the integuments are divided, a portion of them is to be dissected, by a scapel, from the muscles, so as to cover the stump completely. Then the surgeon is to take the amputation knife a second time, and he is to divide the whole of the muscles a little higher up than the first incision in the integuments, perpendicularly to the bone. Then the muscles are to be separated a little from the bone, to admit of its being divided a little higher up than the muscles. Two retractors are then to be applied to support the soft parts, and keep them from being injured by the saw, with which the bone is now to be cautiously, and with gentle strokes, divided. As soon as the leg is removed, any protruding spiculæ left by the saw are to be taken off by a pair of pincers made for that purpose. If the femoral artery is discovered, it is immediately to be secured by a ligature. The tourniquet is then to be slackened a little, to discover any other vessels which may be easily laid hold of and secured. Then the clotted blood is to be removed by a sponge, and the ligatures are to be allowed to hang out at the inferior angle of the wound. The edges of the wound being now brought into contact, by drawing the integuments over the surface of the wound, they are to be retained by adhesive straps, so as to effect a cure by the first intention. The wound is then to be covered by soft lint, and the patient is to be laid in bed, and an opiate given him. The stump is then to be laid on a pillow, to which it should be fixed by straps, and the pillow should be also secured to the bed, to prevent any spasmodic starting of the stump. To obviate the inconvenience attending the pressure of the bed-clothes upon the stump, a frame with a number of hoops is generally recommended. The tourniquet should be allowed to remain still upon the limb, but in a very slack state, as it may be immediately straitened by the person attending the patient, upon any certain hæmorrhagy occurring, until the surgeon is called for, to secure the bleeding vessels.

"Q. 322. *In the after-treatment of Amputation, what are the principal circumstances to be attended to?*

"A. To prevent excessive inflammation from taking place, by using a strict antiphlogistic regimen. But this rule is not to be always followed in weak relaxed habits, where a different mode of treatment is necessary. The first dressings ought to be removed the third day after the operation, and new dressings are to be applied, as at first, every second day, until the inflammation

tion has entirely subsided. Then the ligatures are to be removed, pulling them gradually and gently every day until they come easily off."

The operation of the trepan is also described in a fuller manner than most of the others, and with great clearness; it is as follows:

"Q. 329. *How is Compression of the Brain, arising from a depression of the bones of the cranium, to be treated?*

"A. The wound is first to be enlarged, to ascertain the existence of the fracture; its situation and extent is then to be attended to. When several detached pieces of the cranium press upon the brain, they are to be removed by a forceps; but when a portion of the cranium presses upon the brain, and is not detached from the other bones of the cranium, and is so situated that it can neither be removed, nor raised into the same level with the rest of the bones, without a considerable risk of injuring the brain very materially, an instrument, named *trepan*, has been generally employed to make a perforation, at the points preventing the bone from being raised, so as to admit of an instrument for elevating the depressed portion of the bone. Such perforations are, however, attended with more danger in some parts of the cranium than in others. A complete knowledge, therefore, of the anatomy of the head is absolutely necessary. The most dangerous parts are the frontal sinuses and the back part of the occipital bone. As soon as this operation is determined to be performed, a small portion of the pericranium may be removed by a scalpel just equal to the modiolus of the trepan. A small hole is then to be made with a perforator, to admit of the centre pin of the trepan, which ought to be of a cylindrical form. A portion of the depressed piece may be included within the circular division made by the trepan. The weight of the instrument, during the operation, is to be laid on the contiguous sound bone. Several turns being now performed by the saw, the centre pin is to be removed. The surgeon may use either a trepan or trephine; but the former executes the operation much quicker, and answers equally well, by moving it slowly and cautiously, when he has nearly penetrated through the bone; or the surgeon may begin the operation by the trepan, and finish it by the trephine. The trepan ought to be frequently removed, to examine what depth it has penetrated. Every time it is removed, it is to be rubbed with a small brush made for the purpose. As soon as the surgeon has come to the diploe, he is to secure any hæmorrhagy of consequence that

that may occur. When the bone is nearly divided through, if one portion of the bone is completely divided, and the rest still uncut, the pressure of the instrument is to be entirely applied to the undivided portions. As soon as the bone is found loose, it is to be removed by a small forceps, made for that purpose. The depressed portion of the bone is now to be raised, by an instrument termed a *levator,* introduced at the opening made by the trepan, under the depressed portion of the bone. If, after applying a considerable degree of force, the bone cannot still be raised, and if it seems to be wedged in by some other process of bone, the trepan is to be applied again at that part. The depressed piece being now raised, and any extraneous body that may happen to have been pushed in upon the dura mater, extracted, the clotted blood, or serum, being also removed, the wound is to be dressed with a little lint, spread over with some simple ointment, and the patient is to be laid in bed in the easiest manner. Inflammation of the brain is now particularly to be guarded against, by a strict antiphlogistic regimen. The matter formed on the surface of the wound is to be removed cautiously, by a sponge. By degrees, new granulations form on the surface of the dura mater, and sometimes extend beyond it, and form tumours; which may be easily removed by ligature, or they may be touched by lunar caustic."

The treatment of burns, actually practised, is so variable and contradictory, that it cannot be expected that any thing consistent can be made out of such heterogeneous materials.

In describing the process of inflating the lungs, in order to restore drowned or suffocated persons, the precaution of pressing upon the thyroid cartilage, to shut the œsophagus, might have been mentioned, as we believe it is in common practice.

The ninth order, that of Obstruction, contains, among the most important of its genera, Suffocation, Ischuria, Calculus, the Operation of Lithotomy, and Cataract.

We could not help smiling a little at the following explanation: in answer to the question, What are the causes tending to the formation of calculi in the bladder? the author very justly proceeds to remark the futility of the several reasons usually assigned, such as, decomposition [deposition] of earthy matter from the blood by means of a sedentary life, articles of diet containing earthy matter, and the like; and he then offers the following as a more probable explanation:

"The most probable cause yet discovered, seems to be, a certain state or change of the vessels of the kidney, which

form the urine, possessing properties different from any yet discovered in the blood before it has passed through the kidneys. That a peculiar action of the kidney is capable of forming urine, predisposed to the formation of calculi, is evident, from the saccharum urini formed in cases of diabetes."

The high operation for lithotomy is now so entirely disused, that we think the account of it might have been omitted.

Among the objections to couching the author observes, "that it always fails, when the lens is found in a dissolved state; that, by allowing the matter of the cataract to mix with the vitreous humour, a permanent blindness is the consequence."

This we can take upon ourselves to say is not correct, having seen a case where the cataract was found precisely in this state, and yet was followed by a perfect cure.

The last order is that of Distortion, including the Wry-neck, Squinting, Club-foot, and Distortion of the Pelvis, which suggest no particular remarks.

In concluding our account of this article, we must repeat, that we do not see the necessity of adopting a laboured nosological system as a basis for a course of instruction in surgery. In those cases (which perhaps will not be found very rare) where the student is not sufficiently familiar with the Latin and Greek radicals which compose the terms of nosology, he will be obliged to burden his memory with the explanation of a number of names which only teach him *to name his tools.* The teacher too must lose the invaluable advantage of beginning with the simplest cases of surgery, and proceeding gradually to the more difficult and complicated, and such as require the greatest union of sound judgment with nice anatomical knowledge.

The execution of the work before us we have, however, found to be, on the whole, judicious, and not impaired by errors of any magnitude; but by attempting to include a vast bulk of matter in so inadequate a compass, the descriptions are of course superficial, often defective, and it will be of more use to refresh the memory than as an elementary book for the student.

Art. IV. *Phytologia; or the Philosophy of Agriculture and Gardening. With the Theory of draining Morasses, and with an improved Construction of the Drill Plough.* By Erasmus Darwin, M.D. F.R.S. Author of Zoonomia, and of the Botanic Garden. Quarto. 612 pages. Johnson, London. 1800. Price 1*l.* 11*s.* 6*d.*

THE phenomena of the material world may properly be divided into two great classes: the first comprehending the sensible actions of bodies on each other, or mechanical philosophy: the second will include the insensible actions, or operations which are too minute to fall within the reach of our observation, though the effects produced by them may be sufficiently evident; this class may again be subdivided into two great orders—Chemistry, and the Philosophy of living matter.

Though mechanical philosophy cannot be said to be perfect; for perfection, when referring to human knowledge, may be looked upon as an asymptote, which approaches continually nearer to its curve, but will never touch it; yet this branch of knowledge has made much greater advances than the others; nor indeed is this surprising, for the phenomena are evident to the senses, and can be subjected to weight and measure. Within a few years, however, chemistry has made rapid progress; and during its march from infancy to maturity, has shed a lustre over the other sciences. The philosophy of living matter, which is perhaps the most important of all human knowledge, has made but few advances; for medicine and agriculture, which almost entirely depend upon it, have continued only to be arts, consisting of numerous detached facts and vague opinions, without a theory to connect them, or appreciate their analogy.

The first specimen of just reasoning, with respect to animal life, was presented to us by Dr. Brown, which, though it was violently opposed, continues to gain ground, and has undoubtedly influenced the practice of medicine in most parts of the world. Dr. Darwin, without any communication with Brown, or without knowing any thing of his system, had been led by his investigations to a similar view of life, which he has since published under the title of Zoonomia. Thus did these two philosophers arrive at a similar conclusion; and we may venture to predict, that the application of the new chemistry, to the laws of irritability investigated by them, will in time rescue medicine from the imputation cast upon it by one of its emi-

nent professors, of being a conjectural art, and place it in the list of the sciences.

Brown extended his scheme to vegetable life, but did not enter minutely into the theory of vegetation, only throwing out some hints to guide future inquirers. Since his time, chemistry has been very successfully applied to agriculture by Kirwan and Dundonald; and our author here presents us with an extended investigation of the philosophy of vegetable life. His design is thus expressed in the Introduction:

"Our imperfect acquaintance with the physiology and economy of vegetation, is the principal cause of the great immaturity of our knowledge of agriculture and gardening. I shall, therefore, first attempt a theory of vegetation, deduced principally from the experiments of Hales, Grew, Malpighi, Bonnet, Du Hamel, Buffon, Spallanzani, Priestley, and the philosophers of the Linnæan school, with a few observations and opinions of my own; some of which have in part already appeared in Zoonomia, and in the notes to the Botanic Garden, but are here corrected and enlarged. To the former of which works I hope this may be esteemed a supplement, as it is properly a continuation of the subject.

"My inducement to commence this work, after it was suggested to me by the letters of Sir John Sinclair, was a belief, that the experiments and observations already made on the growth of plants, with the modern improvements in chemistry, were sufficiently numerous and accurate for the establishment of a true theory of vegetation; so much wanted to connect the various facts in the memory, to appreciate their value, and to compare them with each other; and finally to direct the prosecution of future experiments to useful purposes."

The work is divided into three parts: 1. The Physiology of Vegetation—2. Economy of Vegetation—3. Agriculture and Horticulture.

The author begins by observing, that we have been so accustomed to consider life and irritability to be associated with palpable warmth and visible motion, that we hesitate to ascribe them to the comparatively cold and motionless fibres of plants. But to reason rightly on many vegetable phenomena, he first thinks it necessary to shew, that vegetables are in reality an inferior order of animals. A bud, he observes, torn from the branch of a tree, will grow, and become a plant in every respect like its parent; which "evinces that every

bud

bud of a tree is an individual vegetable being; and that a tree, therefore, is a family or swarm of individual plants, like the polypus, with its young growing out of its sides; or like the branching cells of the coral-insect." In the inoculating and ingrafting of fruit-trees, five or six different kinds of pears are frequently seen on the branches of one tree, which, he remarks, could not then properly be termed an individual being.

After old oaks or willows have lost by decay almost all their solid internal wood, the bark and branches frequently continue healthy; whence it appears, that no part of the tree is alive but the buds, and the bark, and the root-fibres; that the bark is only an intertexture of the caudexes of the numerous buds, as they pass down to shoot their radicals into the earth; and that the solid timber of a tree ceases to be alive, and is then only of service to support the numerous family of buds in the air above the herbaceous vegetables in their vicinity.

The buds of trees, our author regards as biennial plants, as they are generated in one summer, and in the next either produce seeds and die, or produce other buds, whose caudexes form a new bark over the former one, that of the last year first becoming a softer or more porous wood, called alburnum, or sap-wood, and gradually hardening into solid timber, which ceases to possess vegetable life.

The buds producing flowers, he likewise regards each as individual beings, as well as the leaf-buds, though they are probably not so easily capable of transplantation into the bark of other trees by inoculation; and he believes it is from the mistakes of the gardeners in choosing flower-buds instead of leaf-buds to inoculate with, that so many buds die in this mode of propagation. Nor does the existence of many male and female parts in one flower destroy its individuality any more than the number of paps of a sow or bitch, or the number of their cotyledons, each of which, during gestation, belongs to a separate fetus.

These buds are likewise biennial plants like the leaf-buds; but as the new buds generated by leaf-buds continue to adhere to the parent, they are furnished with their numerous caudexes, which form a new bark over the old one, whereas the flower-buds generate seeds, which when mature fall upon the ground, and thus they die in the autumn without increasing the size of the parent-tree by the adhesion of their progeny like the leaf-buds.

These buds of plants, which are each an individual vegetable being, in many circumstances resemble individual animals; but as animal bodies are detached from the earth, and move from place to place in search of food, and take that food at considerable intervals of time, and prepare it for their nourishment within their own bodies, after it is taken; it is evident, that they must require many organs and powers, which are not necessary to a stationary bud. As vegetables are immoveably fixed to the soil, from whence they draw their aliment ready prepared, and this uniformly, and not at returning intervals, it follows, that in examining their anatomy we are not to look for muscles of locomotion, as legs and arms, nor for organs to receive and prepare their aliment, as a mouth, throat, stomach, and bowels, by which contrivances animals are enabled to live many hours without new supplies of food from without.

Vegetables are found to resemble animals in the following particulars:

"First, a threefold system of absorbent vessels, one branch of which is designed to imbibe the nutritious moisture of the earth, as the lacteals imbibe the chyle from the stomach and intestines of animals; another to imbibe the water of the atmosphere, opening its mouths on the cuticle of the leaves and branches, like the cutaneous lymphatic vessels of animals; and a third to imbibe the secreted fluids from the internal cavities of the vegetable system, like the cellular lymphatics of animals.

"Secondly, in the vegetable fetus, as in seeds or buds, another system of absorbent vessels is to be expected, which may be termed umbilical vessels, as described in Sect. III. of this work, which supply nutriment to the new bud or seed, similar to that of the albumen of the egg, or the liquor amnii of the uterus; and also another system of arterial vessels, which may be termed placental ones, corresponding with those of the animal fetus in the egg or in the womb, which supply the blood of the embryon with due oxygenation before its nativity.

"Thirdly, a pulmonary system correspondent to the lungs of aërial animals, or to the gills of aquatic ones, by which the fluid absorbed by the lacteals and lymphatics may be exposed to the influence of the air. This is done by the leaves of plants, or the petals of flowers; those in the air resembling lungs, and those in the water resembling gills.

"Fourthly, an arterial system to convey the fluid thus elaborated to the various glands of the vegetable for the purposes of

of its growth, nutrition, and secretions; and a system of veins to bring back a part of the blood not thus expended.

"Fifthly, the various glands which separate from the vegetable blood the honey, wax, gum, resin, starch, sugar, essential oil, and other secretions.

"Sixthly, the organs adapted to the lateral or viviparous generation of plants by buds, or to their sexual or oviparous propagation by seeds.

"Seventhly, longitudinal muscles to turn their leaves to the light, and to expand or close their petals or their calyxes; and vascular muscles to perform the absorption and circulation of their fluids, with their attendant nerves, and a brain, or common sensorium, belonging to each individual seed or bud."

In the second section of this part our author relates some experiments, which shew the existence of that branch of absorbent vessels which resembles the lacteals of animal bodies, and imbibes their nutriment from the moist earth; when twigs of the fig-tree, and other vegetables, are placed in a decoction of madder, logwood, or dilute ink, on cutting the twig in two, an internal circle of red points appear, which are the ends of the absorbents, while an external ring of arteries is seen to bleed out a milky juice, which evinces the existence of both an absorbent and arterial system, the absorbents forming a ring in the sap-wood beneath the bark, while a ring of arteries is situated exterior to them. These absorbent vessels have erroneously been believed to be air-vessels by Malpighi, Grew, and others. There are, nevertheless, horizontal air-vessels of large diameter, which pass through the bark of trees to the alburnum. These our author supposes to contain air enclosed in a thin moist membrane, which may serve the purpose of oxygenating the fluid in the extremities of some fine arteries of the embryon buds, in the same manner that the air in the broad end of the egg is believed to oxygenate the fluids in the termination of the placental vessels of the embryon chick.

The absorbent vessels consist of long hollow cylinders, whose sides are composed of a spiral line, and are of such large diameters in some vegetables, as to be visible to the naked eye when they become dry and empty, as in the cane. These vegetable absorbents differ from animals in the facility with which they carry their fluids either way; for a forked branch of a tree torn from its trunk, and having one of its forks with the leaves on it inverted in a vessel of water, will continue

continue for several days unwithered, nearly as well as if the whole had been placed upright in the water. A willow rod, for the same reason, will grow almost equally, whether the apex or base of it be set in the ground.

This power of carrying their fluid contents in a retrograde direction, our author observes, is also possessed, in some degree, by the absorbents of animals, particularly in their diseased state, and in the operation of emetics and ruminating cows. These absorbent vessels consist of a spiral line, as has been observed; and that they are not arteries or veins, is evinced by inspecting a stem of euphorbia, spurge, or the stalk of a fig-leaf, ficus, immediately on dividing them; for the milky juice oozes from a ring of vessels exterior to those large absorbents.

Dr. D. supposes, that "if the minuter branches of vegetable absorbents be of a similar structure, it is easy to conceive how a vermicular or peristaltic motion of the vessel, beginning at the lowest part of it, each spiral ring successively contracting itself, *till it fills up the tube,* must forcibly push forwards its contents without the aid of valves; and if this vermicular motion should begin at the upper end of the vessel, it must with equal facility carry its contained fluid in a retrograde or contrary direction.

"As the absorbent vessels in the roots of plants are protected from the frost in some degree by the earth which covers them; they seem at all times to be sufficiently alive to drink up and push forwards their adapted fluid, since if a branch of a tree is brought into a warm room, it will in general pullulate in the winter, as soon as the vessels of the upper part of the branch are rendered sufficiently irritable by warmth to act in concert with the absorbents of the root. Nevertheless, in severe frosts it is necessary to guard all the parts of the stem which are exposed to the open air, as is experienced in the vines brought through holes into hot-houses; otherwise, after the buds are put out, a severe frost so affects the stems on the outside of the house as to destroy all the fruit of that year. Kenedy on Gardening, vol. i. p. 270. And it is observed in Mr. A. Aikin's Natural History of the Year, that much ice was carried from the streets in London in 1794, and piled round some elm trees in Moorfields, many of which were destroyed in the ensuing spring by the slow melting of it."

The third section treats of *the umbilical vessels of seeds and buds*; and the author proceeds to shew, that the seeds of vegetables are a sexual offspring corresponding with the eggs of animals,

animals, and contain, like them, not only the rudiments of the new organization, but also a quantity of aliment laid up for its early nourishment.

The vessels which may properly be called umbilical, pass from the heart or corculum of the seed, which is the living embryon of the future plant, into the seed-lobes, commonly called cotyledons, and imbibe from thence a solution of the farinaceous or oily matter there deposited for the nutriment of the new vegetable.

These umbilical vessels probably, he observes, consist of a system of absorbents, which supply nutriment to the embryon plant from the cotyledons of the seed, and also of a system of placental arteries and veins spread on the humid membrane, which covers the cotyledons, and is moistened by its contact with the earth, for the purpose of oxygenating the vegetable blood. This idea is countenanced by many plants bringing up their cotyledons, or seed-lobes, out of the ground into the air, which are then converted into leaves, and perform the office of lungs, after they have given up beneath the soil the nutriment, which they previously contained, as in the young kidney-bean, phaseolus; so the white corol of the helleborus niger, christmas rose, is changed into a green calyx by loosing one system of arteries after the impregnation of the seeds.

The seed embryon therefore resembles the chick in the egg, first as when vivified by the influence of external warmth they both begin their growth by the absorbent system of vessels being stimulated into action by their adapted nutriment; and the fluids thus pushed forwards stimulate into action the other parts of the system, consisting at first principally of arteries and glands.

The seeds of plants our author considers as a sexual or amatorial progeny, produced principally by the male part of the flower, and received into a proper nidus, and supplied with nutriment by the female part of it, and which can thus claim both a father and a mother. But the buds of vegetables are a linear progeny, produced and nourished by a father alone, to whom they adhere, not falling off like the seeds. For in this most simple kind of vegetable reproduction, by the buds of trees, and by the bulbs of some plants, and by the wires of others, which are their viviparous progeny, the caudex of the leaf is the parent of the bud or bulb, or wire, which rises in its bosom, according to the observation of Linneus.

This linear or paternal progeny of vegetables in buds or

 bulbs,

bulbs, or wires, is attended with a very curious circumstance, which is, that they exactly resemble their parents, when they are arrived at their maturity, as is observed in grafting fruit-trees, and in propagating flower-roots, or strawberries, or potatoes, by their wires or roots; whereas the seminal offspring of plants, as it derives its form in part from the mother as well as father, is liable to perpetual variation, both which events are employed to great advantage by skilful gardeners.

The vessels which convey the sap-juice with very great force, as has been shewn by Dr. Hales and Dr. Walker, are situated in, or compose the alburnum or sap-wood of the trunk or root of the tree; nor is it surprising, that some of it, when pressed by so high a column, should exsude into the cells between the alburnum and bark, as in these cells much sap-juice was observed by Dr. Walker; and this accounts for the great ease with which the barks of willows and of oaks are separated in the spring from their wood. The absorbent mouths of these sap-vessels open externally in the moist earth on the roots of trees, and also into the air on their trunks; and thus mix the aqueous fluids, which they thus imbibe, with the saccharine and mucilaginous materials deposited previously in the alburnum of these roots and trunks.

"This ascending sap-juice," he observes, "is, during the spring season, in some trees so sweet, that it is used in making wine, as that of the birch-tree in this country; and sugar is procured in such quantity from a maple in Pennsylvania, that from each tree five or six pounds of good sugar have been made annually without destroying it. Rush, on Sugar Maple. Phillips, London. This sugar is deposited in the sap-wood of the trunk and roots of trees, as in the manna-ash, and is dissolved in the spring by the moisture, which is drank up by the absorbents from the earth and atmosphere, and forcibly carried on to expand the buds. Its existence in the sap-wood as well as in the roots is shewn from the pullulation of oak-trees, which have been stripped of their bark, and also from the expansion of the eyes of a vine-shoot, when it is cut from the tree, and planted in the earth."

This suggests to him a probable reason why the wood of trees is so much sooner subject to decay, when they are felled in the vernal months; because the sugar, which the sap-wood then contains, soon runs into fermentation, and produces what is called the dry rot; whence the custom has prevailed of debarking oaks in the spring, and felling them in the autumn; and it is probable that the wood of all other trees would last

much longer, if it was thus managed, as the growth of the new leaves would exhaust the sugar of the sap-wood.

The means by which vegetable absorbent vessels, in their living state, imbibe the fluids of the earth and atmosphere, and carry them forwards with so much force, must, Dr. D. supposes, be similar to those, with which animal absorbent vessels perform the same office; that is, by their mouths being excited into action by the stimulus of the fluids, which they absorb.

This circumstance is confirmed by the evident proofs of the irritability of plants in various other instances, as the closing and opening of the petals and calyxes of flowers by light and darkness, warmth and cold, dryness and moisture, and by the motions of the leaves of mimosa, or sensitive plant, and of dionœa muscipula, by any mechanical stimulus. To this might be added a variety of instances of the irritability of vegetables to the stimulus of heat, being increased after a previous exposure to cold, exactly in the same manner as happens to animal bodies.

"During the great action of these umbilical absorbent vessels the buds become expanded, that is, the young vegetable beings put forth leaves, which are their lungs, and consist of a pulmonary artery, vein, and absorbents, and also acquire a new bark over that of the branches, trunk, and roots, of the last year, which consists of aortal arteries, veins, and absorbents, and new radicles, which terminate in the soil. At this time the umbilical vessels, which existed in the alburnum, or sap-wood, cease to act, and coalesce into more solid wood, perhaps simply by the contraction of the spiral fibre, of which they are composed; and the swarm of new vegetables, which constitute a tree, are now nourished by their proper lacteal and lymphatic systems."

The author next proceeds to make some ingenious remarks on ingrafting and inoculation, and observes, that as buds are formed at midsummer, they may at that time be transplanted by inoculation; but if we take them so late as the ensuing spring, they must be ingrafted, that they may grow by the inosculation of vessels, like the inflamed parts of animals.

At the end of this section our author observes, that "from many ingenious observations on vegetables Monsieur de la Baisse draws the following conclusions, which are assented to by M. Bonnet, and which I shall here transcribe, as they so accurately coincide with the theory above delivered, and as they were deduced from different experiments, are a confirmation of

 it.

it. He says, ' that the vessels destined to convey nourishment ' to plants are neither in the pith, nor in the bark, nor between ' the bark and the wood; but in the ligneous substance itself; ' or, to speak more accurately, that those vessels are themselves ' the woody fibres included between the pith and the bark of ' plants, which have their origin in the roots, and extend them- ' selves to every part of the plant'."

In the fourth section the author considers *the pulmonary arteries and veins of vegetables.* He begins with pointing out that *leaves* are neither perspiratory, excretory, nutritious, or electric organs, as has been imagined by different philosophers; but the lungs of vegetables, or the organ by means of which the vegetable juices become oxygenated by combining with the oxygen of the atmosphere. The great surface of their leaves, compared to that of the trunk and branches of trees, is such, as shews that the leaves form an organ well adapted for the purpose of exposing the vegetable juices to the influence of the air. Aërial or aquatic animals, by their muscular exertions, produce a current of air or water reciprocally to and from their lungs, and can occasionally change the place, where they respire, when the air or water becomes vitiated. But as vegetables have but little muscular power to move their leaves, except in a few instances; and as the air or water is frequently nearly stationary, where they exist, it seems to have been necessary to expose their fluids to the air or water on a greater expanse of surface than in the lungs or gills of animals, which well accounts for the exuberant extent of their foliage.

As there is less uncombined oxygen in water than in the atmosphere, and as it is only the uncombined proportion which can be used in respiration, the surface of the gills, which are the lungs of fish, is much greater in proportion to their bulk than in land animals. In this respect the gills of fish are resembled by the subaquatic leaves of plants, which are slit into long wires terminated in points, as in trapa, œnanthe, hottonia, the water-violet, and the water-ranunculus. This last plant, and some others, have frequently some leaves erect in the air, and others immersed in water, arising from the same stem; and it is curious to observe that the aërial leaves are nearly entire, or divided only into a few lobes; whilst the aquatic leaves are slit into innumerable branches like a fringe, and have thus their surfaces wonderfully enlarged for the purpose of acquiring uncombined oxygen from the air, which is diffused in the water, and which abounds so much less there than in the atmosphere.

At

At page 51 the author gives a recapitulation of the arguments tending to shew, that the leaves of vegetables are their lungs, which we shall transcribe. "1. They consist of an artery, which carries the sap to the extreme surface of the upper side of the leaf, and there exposes it under a thin moist pellicle to the action of the air; and of veins, which there collect and return it to the foot-stalk of the leaf, like the pulmonary system of animals. 2. In this organ this pellucid sap is changed to a coloured blood, like the chyle in passing through the lungs of animals. 3. The leaves of aquatic plants are furnished with a larger surface, and with points like the gills of aquatic animals. 4. The upper sides of aërial leaves repel moisture, like the larynx of animals. 5. Leaves are killed by smearing them with oil, which in the same manner destroys insects by stopping their spiracula, or the air-holes to their lungs. 6. Leaves have muscles appropriated to turn them to the light, which is necessary to their respiration, as will be shewn in the section on Light. 7. To this may be added an experiment of Mr. Papin, related by M. Duhamel. He put an entire plant into the exhausted receiver of an air-pump, and it soon perished; but on keeping the whole plant in this vacuum except the leaves, which were exposed to the air, it continued to live a long time, which, he adds, is a proof that the leaves are the organs of respiration. Physic des Arbres, V. I. p. 169."

But besides these organs of respiration, there appears to be another pulmonary system totally independent of the green foliage, which belongs to the sexual parts of the fructification only, viz. the corol or petals. In this there is an artery belonging to each petal, which conveys the vegetable blood to its extremities, exposing it to the light and air under a delicate moist membrane covering the internal surface of the petal, where it often changes its colour, as is beautifully seen in some party-coloured poppies, though it is probable that some of the iridescent colours of flowers may be owing to the different degrees of tenuity of the exterior membrane of the petal refracting the light like soap-bubbles.

The vegetable blood is then collected at the extremities of the corol-arteries, and returned by correspondent veins exactly as in the green foliage, for the sustenance of the anthers and stigmas, and for the important secretions of honey, wax, essential oil, and the prolific dust of the anthers, and thus constitutes a pulmonary organ."

A more

A more complete oxygenation seems necessary for forming the honey, sugar, and prolific dust; and this is accomplished in those beautiful parts called the flowers of vegetables.

From the observations and experiments related in this section, the author draws the following general conclusion, "that the common leaves of trees are the lungs of the individual vegetable beings, which form during the summer new buds in their bosoms, whether leaf-buds or flower-buds, and which, in respect to the deciduous trees of this climate, perish in autumn; while the new buds remain to expand in the ensuing spring. Secondly, that the bractes, or floral-leaves, are the lungs of the pericarp or uterus, and to the growing seeds which it contains, as the bractes on the stem of the crown-imperial, fritillaria imperialis, and the tuft above its flowers. And thirdly, that the corol or petals are the lungs belonging to the anthers and stigmas, which are the sexual or amatorial parts of the plant, and to the nectaries for the secretion of honey, and to the other glands which affords essential oil and wax.

"Lastly, the stamina and stigma with the petals and nectary, which constitute the vegetable males, and the amatorial part of the female, as they in some plants appear before the green leaves or bractes, as in colchicum and mezereon, and in all plants fall off when the female uterus is impregnated, would appear to be distinct beings, totally different both from the leaf-buds, which produce a viviparous progeny; and also from the bractes with the calyx and pericarp, which constitute the vegetable uterus.

"They must at first receive nutriment from the vernal sap-juice, like the expanding foliage of the leaf-buds, or the bractes of the flower-buds. But when the corol becomes expanded, and constitutes a new pulmonary organ, the vegetable juices are exposed to the air in the extremities of its fine arteries, beneath a moist pellicle, for the purpose of greater oxygenation, and for the important secretion of honey; and then the anthers and stigmas are supplied with this more nutritious food, which they absorb from its receptacle, the nectary, after it has there been exposed to the air, and are thus furnished with greater irritability, and with the necessary amatorial sensibility, and live like bees and butterflies on that nutritious fluid."

The fifth section is on the *Aortal Arteries and Veins*; and he endeavours to shew, that there is a double circulation in vegetables

vegetables as well as in animals, a pulmonary one through their leaves or lungs, for the purpose of oxydating the blood, and an aortal one, which conveys the blood thus oxydated, or in some way materially changed, to all parts of the body for their nourishment. The circulation of the vegetable juices in the leaves of plants, and in their trunks and roots, is performed without a heart. The absorbent vessels of the roots, of the internal cells, and of the external bark, with the venous blood returning from those parts, unite at the foot-stalk of the leaf; and then, like the vena portarum, an artery commences without the intervention of a heart, and receiving the sap and venous blood, spreads it in numerous ramifications on the upper surface of the leaf; here it changes its colour, and becomes vegetable blood; and is again collected by a pulmonary vein, and returns on the under surface of the leaf. This vein, like that which receives the blood from the gills of fish, assumes the office of an artery, which corresponds with the aorta of animals, and branching again disperses the blood upward to the plumula or summit of the bud, from its caudex at the foot-stalk of the leaf, and downward along the bark of the trunk to the roots; where it is received by a vein corresponding to the vena cava of animals, after having expended what was required for the secretions, excretions, and nutrition, and returns to the caudex of the bud, and to the foot-stalk of the leaf.

The author supposes, that the blood in the *vena cava* of the human body, as well as the fluids imbibed by the lacteals and lymphatics, are carried forwards to the heart by the power alone of their absorbent mouths, which drink up their blood from the capillaries, or their other fluids from the surfaces or cavities of the body: and likewise, that the whole circulation in vegetables is performed in very minute vessels without valves, and without a heart, solely by the power of absorption; circumstances which have long perplexed the physiology both of the animal and vegetable kingdoms.

Dr. D. finally concludes, that "the circulation of vegetables is performed like that of animals by the irritability of their vessels to the stimulus of the fluids, which they absorb and protrude; that is, that the extremities of the branching veins of the leaves forcibly absorb the vegetable blood from the extremities of their arteries, which correspond with the pulmonary arteries of animals; and that it is thus pushed on to the foot-stalk of the leaf, where the veins unite, and branching out again take the office of an artery, like the aorta in fish, without

out perceptible pulsation. The blood in this artery is pushed forwards by that behind it, the motion of which was given by the power of absorption in the pulmonary vein, till it arrives at the extremities of these aortal branches, and is there again forcibly absorbed by the terminations of the correspondent veins, and again pushed forwards to the caudex gemmæ, and to the foot-stalk of the leaf, like the blood in the vena cava of animals."

In the sixth section the author considers *the Glands and Secretions of Vegetables*; and presents us with a variety of facts and ingenious conjectures concerning the formation of sugar, honey, &c. Starch he considers as a kind of mucilage, which differs from the common mucilages in its property of not dissolving in cold water, and hence it may be easily separated from them. The following receipt for making potatoe bread may not, in these times, be unacceptable to our readers: "If eight pounds of good raw potatoes be grated by means of a bread-grater into cold water; and, after well agitating the mixture, the starch be suffered to subside; and this starch be then mixed with eight other pounds of boiled potatoes, as good bread may be made as from the best wheat flour; as is affirmed by Mons. Parmentier. From this it appears, that the quantity of starch in potatoes and in wheat produces the principal difference of their respective flours."

"There is reason to believe," he adds, "that the mucilage during the growth of the plant is converted into starch; and that this process continues in grain some time after it is carried into the barn or granary, which occasions old wheat to produce better flour for the baker; and old oats and old beans are universally believed to give more nourishment to horses. I shall here add a conjecture, that I suppose the use of alum in making bread consists in its coagulating the mucilage, and perhaps thus contributing to convert it into starch; for the bakers mix it principally with new wheat; and affirm, that it makes the flour of new wheat equal to old.

"Where much alum is mixed with bread, it may be distinguished by the eye by a curious circumstance, which is, that where two loaves have stuck together in the oven, they break from each other with a much smoother surface, where they had adhered, than those loaves do which do not contain alum.

"Add to this, that alum is also used by the London bakers for the purpose of clearing the river water, with which they are

are supplied, which is frequently muddy; and also for instantaneously destroying the volatile alkali, which is said to exist in some London wells, owing to the vicinity of dung-hills. These purposes it probably fulfils by coagulating the mucilage, which may occasionally be mixed with the water and support the mud in it; or by uniting with the calcareous earth, or with the volatile alkali which it may contain, and depositing the new-formed gypsum, or its own argillaceous base, the descent of which may carry down other impurities along with it, in the same manner as some muddy wines have been rendered fine, not by filtering them through sand, as then the mud retained on the surface of the sand soon prevents the descent of the wine through it, but by passing clean sand in showers by means of a riddle through the wine. Alum is said to be used by the Chinese for the purpose of cleaning the water of some stagnant reservoirs; and when used in small quantity may, in all these respects, be rather salutary than injurious to the bread of London."

We know not whether we can perfectly agree with the ingenious author, with respect to the salutary effects of alum in bread; and we know, from experience, that such bread is very apt to produce obstinate costiveness.

The seventh section treats of *the Organs of Reproduction of Vegetables*, and is replete with ingenuity. The author defends the sexual system of Linnæus, and brings forward many beautiful analogies between the faculties of generation in vegetables and animals, some of which, however, appear to us far-fetched.

The following observations are curious, and the deductions from them may be useful: "The paternal offspring of vegetables in their buds and bulbs is attended with a very curious circumstance; and that is, that they exactly resemble their parents, as is observable in grafting fruit-trees, and in propagating flower-roots; whereas the seminal offspring of plants, being generated by two parents, and certainly supplied with nutriment by the mother, is liable to perpetual variation."

"As the progeny by lateral generation so exactly resembles the parent stock, it follows, that though any new variety, or improvement, may be thus continued for a century or two, as in grafted fruit-trees, yet that no new variety or improvement can be obtained by this mode of generation; though some hereditary diseases, as the canker, are believed to arise in ingrafted trees, which have long been propagated by lateral generation, as explained in this section.

 "But

" But from the sexual or amatorial generation of plants, new varieties, or improvements, are frequently obtained; as many of the young plants from seeds are dissimilar to the parent, and some of them superior to the parent in the qualities we wish to possess; which is another proof that the anthers and stigmas of plants are animated beings, different from the green foliage of the tree on which they grow; as they produce varieties in the form of their offspring like sexual animals, which buds do not."

" The degeneracy of trees, or perennial herbaceous plants, propagated by buds or root scions, is not, I think, to be ascribed simply to the age of the original seedling-tree, because each successive generation of buds, or bulbs, are as distinct from the parent as the generation by seeds. But as the lateral progeny of vegetables have no source of improvement after they have arrived at their maturity, but are liable, like other plants and animals, to injuries from food and climate, which injuries produce hereditary diseases, it is to this circumstance that their degeneracy ought rather to be ascribed; whereas the sexual progeny of vegetables are liable to improvement, by the intermixture of the individuals of the same, or even of different species, to counteract the effects of hereditary diseases."

The author in this section likewise defends his theory of generation, which he has advanced in the Zoonomia, viz. that in the sexual viviparous generation, the new entity, or embryon, is secreted by the male, and received into a nidus prepared for it by the female, and nourished by fluids secreted into the uterus, as they are required, which is probably owing to the stimulus of the fœtus against the sides of it; that in sexual oviparous generation a reservoir of nutriment is prepared, and enclosed in the egg, previous to the reception of the embryon, which is secreted by the male, and deposited in this reservoir of nutriment; because the fœtus in these animals is to be separated from the parent before its due maturity; and the egg, in which it is enclosed, may be considered as an uterus, or womb, separated from the mother. And lastly, that in paternal or male generation, the new entity, or embryon, is as certainly secreted from a gland of the male, but probably remains in an adapted reservoir belonging to this gland, correspondent to the vesiculæ seminales of most viviparous animals, and that here it exists like the cicatricula in the egg, and has a reservoir of nutriment prepared for it like that in the egg to support it; when the paternal leaf-bud, by its death, is separated from it in the autumn, as the egg is separated from

from its living mother; and we must own, that it acquires some strength from the experiment of Spallanzani, who diluted the seminal fluid of a dog with much warm water, and by injecting it, fecundated a bitch, and produced puppies resembling the dog.

The following idea is highly fanciful, and indeed poetical:

"Thus new animal combinations might possibly be generated numerous as the fabled monsters of antiquity; as between the ram and the female goat; the stag and the cow; the horse and the doe; the bull and the mare; boar and bitch; dog and sow. And secondly, as Spallanzani diluted the seminal fluid of a male frog with water, and fecundated some female spawn with it, and produced perfect tadpoles, there is reason to conclude, that new combinations of fish might thus be generated, and people our rivers with aquatic monsters. And lastly, that it is not impossible, as some philosopher has already supposed, if Spallanzani should continue his experiments, that some beautiful productions might be generated between the vegetable and animal kingdoms, like the eastern fable of the Rose and Nightingale, and which might be propagated by lateral or paternal, though not by sexual or seminal generation.

"The classic reader will here be reminded of the Metamorphoses of Ovid, of gods turned into bulls and swans, men into frogs and partridges, ladies into trees and flowers, of sphinxes, griffins, dragons, mermaids, centaurs, and minotaurs; Pasiphaë and her bull; Leda and her swan; Arethusa and her fish-god Alpheus; and conclude that mules in early times were more frequent than at present, which occasioned the poets and the priests of antiquity to invent so many fabulous monsters, and impose them on the credulity of mankind."

In the eighth section Dr. Darwin proceeds to the consideration of a subject which is highly interesting and curious; *the Muscles, Nerves, and Brain of Vegetables.* He thinks it evident, that they possess muscles from their closing their corols and calyxes, and moving their leaves in consequence of stimulus. When one part of a leaf of mimosa is touched, the whole branch falls; which shews, he thinks, that there must be a vegetable brain, or common sensorium. This being granted, the following questions naturally occur, which he thinks should be answered in the affirmative: Have vegetable buds irritability? have they sensation? have they volition? have they associations of motion? He is persuaded that they

 possess

possess them all, though in a much inferior degree even than the cold-blooded animals.

Their irritability, he thinks, is shewn by the absorption and circulation of their fluids, and by the ascent of sap-juice, as well as by the effect of electricity, which deprives them of the power of contracting on the application of a stimulus, though it does not injure the apparent organization.

Their sensibility is shewn by the collapse of the leaves of the mimosa; by flowers closing their petals from defect of stimulus, as in darkness and cold; by the males and females bending to each other.

Their volition is evinced by the motions of the hedysarum gyrans, which moves its leaves in circular directions when the air is too still; by the tendrils of vines, and stems of other climbing vegetables, which continue to move till they find something to adhere to; and lastly, by the efforts of almost all plants to turn the upper surface of their leaves, or their flowers, to the light.

Their associations of motion are shewn by their closing their petals, and various other motions. Since therefore vegetables possess a sense of heat, of light, and of moisture, as well as a sense of touch, and, in consequence of these senses being affected, perform various complicated and associated motions, they must possess a brain or common sensorium.

In many flowers the anthers, when mature, approach the stigma; in others, the female organ approaches the male. "I ask," says our author, "by what means are the anthers in many flowers, and stigmas in other flowers, directed to find their paramours? Is this curious kind of storge produced by mechanic attraction, or by the sensation of love? The latter opinion is supported by the strongest analogy, because a reproduction of the species is the consequence; and then another organ of sense must be wanted to direct these vegetable amourettes to find each other; one probably analogous to our sense of smell, which, in the animal world, directs the new-born infant to its source of nourishment; and in some animals directs the male to the female; and they may thus possess a faculty of perceiving as well as of producing odours.

"A most curious example of the existence of some kind of sense, which may direct the pistils, or female parts of the flowers of collinsonia, which way to bend for the purpose of finding the mature males, is related in Botanic Garden, vol. i. Canto IV. l. 460, where some of the pistils mistake the males, or stamens, of the neighbouring flowers for their own husbands;

bands; and bending into contact with them, become guilty of adultery."

We have endeavoured to give our readers a view of the first part of this ingenious work; in our next Number we shall proceed to the second part, which treats of *the Economy of Vegetation.*

ART. V. *Two Memoirs on the Cæsarean Operation.* By M. BAUDELOCQUE, sen. Professor of Midwifery in the School of Medicine of Paris, &c. &c. Translated from the French; with a Preface, Notes, an Appendix, and six Engravings, by JOHN HULL, M.D. Octavo. 239 pages. BICKERSTAFF, London. 1801. Price 6*s*.

WHETHER practitioners in this island have made up their minds on the propriety of performing the Cæsarean operation in certain cases, would be a difficult question to decide; much controversy has arisen; and most probably every accoucheur, who has not publicly entered into it, has deliberately weighed the arguments on both sides, and, with the proverbial taciturnity of an Englishman, silently arranged his plan for the occasion when it arrives.—" *They manage these matters better in France.*" No sooner does Mons. Bacqua perform the Cæsarean operation with success, but the Society of Medicine at Paris depute Messrs. Plessman and Baudelocque to examine the case, and make a report of it; and when they have heard this report, they publish a decree, and " *there's an end on't.*" This method certainly saves considerable trouble and anxiety to the practitioner; it gives authority for a dangerous expedient; it shelters him from legal inquiries; and, what is often more terrible in this country, the cross-examination and scrutiny of his cotemporaries, and the clamours of the friends and relations of his patient.

It must not be inferred, that we are displeased with this translation of Mons. Baudelocque's Memoirs; on the contrary, if perseverance be an essential requisite for the attainment either of knowledge, or for overcoming our opponents, the ingenious translator is certainly entitled to our praise; while we also acknowledge his right to bring forward every proof of the practicability and necessity of the Cæsarean operation in support of his own opinions.

When an hypothesis is once promulgated by a physician, it is

is much more difficult for him to retract it than a professor in other sciences. This has been evident at all times; we observe it in the keen satire on the faculty by Le Sage, and we see it daily in those who feebly, although still anxiously, cling to their darling lentors of the blood, spasms on the surface, &c.

The author entitles his first Memoir "Researches and Reflections, serving to elucidate the following questions:

"1st. Do cases exist, in which delivery by the natural passage is physically impossible?

"2d. These cases being determined to exist, is the Cæsarean operation indispensably necessary?

"3d. Is the Cæsarean operation inevitably fatal to the mother?"

And he commences with observations on the importance of the operation, arising from its exposing the life of a single individual to danger, and its possibility of preserving two, and sometimes three lives; and then states his reason for publishing these Memoirs, which we shall give in his own terms:

"In collecting the observations of Mr. Bacqua and all of a similar kind, the Society of Medicine has it less in view to offer to professional men new proofs of the advantages, derivable from the Cæsarean operation, than to furnish them with an opportunity of examining the facts contained in these observations, of comparing them with one another and with those already published, even in the cases wherein it has not been successful, in order to determine what ought to be done to secure greater success, hereafter, from what has been hitherto done to obtain it, and from what has probably been neglected in the unsuccessful cases. By publishing these new observations, the Society will occasion new light to be thrown upon the subject; its correspondents will be eager to communicate their reflections; facts, hitherto unknown, will be transmitted to it, and it will incorporate them with the mass of cases, which it is easy to collect at this time. If they be not all as consoling as those, of which we gave an account in one of the last sittings, the Society will be able to render them useful, by making them concur to the same end, that of fixing the opinion which ought to be held concerning the Cæsarean operation."

Again: "The operation has not always been crowned with success; in most cases, it must be confessed, however distressing this truth may be, that the mother has not recovered. But in these very cases, what would have been her fate, if the operation had not been performed? Would her death, which in that case

was inevitable, have been more easy, or less cruel? And what would have been the lot of the child, which is constantly saved by this operation, when practised in time, that is, before its death? Both parent and offspring would invariably have fallen victims: for by what other means could nature, or art, have succoured them? Can the mother resist for any long time the painful and unavailing efforts made for the expulsion of the infant? And can the infant support these with less danger? How often has the child been destroyed in a less painful struggle, and under efforts less violent than those which are fruitlessly exerted to overcome the obstacles requiring the Cæsarean operation? Its death then is certain, and that of the woman not less so: The testimony of accoucheurs is unanimous upon this point."

We have quoted this passage, to introduce a note respecting the delivery of *Marville*, a case which the author supposes proves so clearly the truth of these assertions, that the founder of the anti-cæsarean school *(Sacombe)* himself cannot now have any doubts. We would willingly give the whole of this case, but our readers will be satisfied with the leading particulars:—The patient was at her full time, and was taken in labour of her first child on the 28th of August 1798. A distorted pelvis was found on examination, and M. Sacombe was called to her assistance on the following evening at six o'clock, and declared his opinion, that she would be delivered without the aid of any instrument, and of a living child. Finding no progress was made, he called Mess. Vitet, Marchais, Boyer, Sue jun. Leclerc, and Baudelocque, on the 29th, at six in the evening, to whom Sacombe gave an account of what had passed during the five days; saying also he *had* believed, "that the labour would terminate fortunately, and that the child would be born alive, although the superior aperture of the pelvis was contracted, and the distance betwixt the ischiatic tuberosities, or the transverse diameter of the inferior aperture, appeared to him to be only eighteen lines, upon this ground, that nature, who gave to this woman the faculty of conceiving, would not refuse her the power of bringing forth. He added, if he had published in his writings that there did not exist any case, in which the female could not be delivered of a living child, it was because his practice had not at that time offered him an example of the kind; that he acknowledged the existence of such cases now that he had met with this, for which we were consulted; but that he still hoped the patient might be delivered without assistance,

ance, although her infant had been dead several days, because she was in a good state both as to strength and health.''

The other gentlemen were of opinion, that the antero-posterior diameter of the superior aperture was not quite two inches and a half, and were unanimous in directing the immediate application of the crotchet, which had been deferred too long, and that the event would be unfortunate. Sacombe acquiesced in their determination, but did not deliver the patient (for what reason is not mentioned) till the next day. She died on the 9th September, five days after delivery. On dissection, the uterus, and other parts of generation, were found in a perfect state of gangrene. The superior aperture of the pelvis measured, from pubis to sacrum, two inches and four lines; the lateral diameter measured five inches.

We presume, M. Baudelocque does not mean this as a case to prove that the Cæsarean operation would have preserved the life of this woman; there does not appear to be a doubt, if the crotchet had been used in proper time, and in able hands, she would have been saved. We cannot suppose *Sacombe*, the declared enemy of crotchets, and all instrumental midwifery, a man prejudiced, and ignorant of the principles of the art, who could give the opinion we have mentioned above, would be a proper operator in a case where so many dreadful causes were hastening the death of the patient. The case can only prove, that delivery was practicable with the crotchet, and that the woman's life was the victim of an impudent charlatan. It becomes another question, how far we are to risk the mother's life to a tremendous operation, to give the infant the chance of existence, because it involves the question concerning the comparative value of both their lives.

The author next considers the particular states where the Cæsarean operation has been supposed necessary: "1st, in the case of extra-uterine gestation; 2dly, where the fœtus has escaped entirely into the cavity of the abdomen, on account of a rupture of the uterus; 3dly, in the case of a hysterocele, or hernia of the uterus, similar to that described by Sennert; 4thly, where tumours, bridles, cicatrices, adhesions, or other affections of the soft parts, included in the pelvis, obstruct this bony canal, the neck of the womb, or the vagina; lastly, when the pelvis is in itself so far defective, that there no longer exists, betwixt its dimensions and those of the head of the fœtus, the relation necessary to delivery."

We shall attend to what the author says on the last of these states.

states. "Although it be fully demonstrated, that a woman cannot be delivered naturally and of a living child, when the small diameter is not more than two inches and a half, the absolute impossibility of delivery will not appear to be an inevitable consequence, since there still remains some hope of effecting it, either by turning the child, or extracting it with instruments. But well-informed practitioners, who will examine these different methods, will soon perceive their difficulties, dangers, and insufficiency, even in the majority of cases under consideration. A single living infant has not been extracted through a pelvis of only two inches and a half in diameter, either by bringing it by the feet, or by means of the forceps, although some accoucheurs contend that they have met with success in this way. In pursuing the first of these two methods, the practitioner has often been obliged to crush the skull of the fœtus, to open it, to pull it away in pieces with the crotchet, or he has torn away the trunk, and separated it from the head, which has remained above the superior aperture, and has occasioned much greater difficulties in the extraction. The application of the forceps cannot procure any greater advantages. If it be possible to lay hold of the head by means of this instrument, we cannot extract it, and after many efforts, equally dangerous and unavailing, we are obliged to have recourse to other means. Since there is so much danger, both to the mother and child, in attempting to deliver by either of these methods, when the diameter of the pelvis is equal to two inches and a half, it would shew ignorance and want of skill to have recourse to them, when the diameter is still smaller: the crotchet alone can then appear to be deserving of recommendation, and it ceases to be so, in its turn, when the deformity is in the greatest degrees. In fact, regarding as nothing the loss of the child, which is sacrificed in the most cruel and most painful manner, how much have we not to fear for the woman, from the use of this instrument, introduced very high, without guide, and, as it were, by chance? Can we be certain of fixing the point of it constantly in the head of the child, and, when it slips, of keeping it from injuring those parts of the mother, that line the pelvis and envelop the head so closely? Can we be certain, that by mutilating the infant we shall save the woman? It would not be difficult to prove, that many more women have died in consequence of the use of the crotchet than of the Cæsarean operation, if practitioners had formed a collection of all those cases, wherein they have delivered, or attempted to deliver, by means of crotchets, as has been done

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with respect to the women who have undergone the Cæsarean section. We have constantly observed contusions and lacerations of the womb, bladder, vagina, rectum, and other neighbouring parts, on opening the bodies of those females who have died after such a delivery, even where the case appeared more favourable to the application of the crotchet, since the pelvis was more than two inches in diameter. Very few women, doubtless, would consent to have their children mutilated, if they knew all the dangers to which they would themselves be exposed by this painful sacrifice.

" If even the thought of using destructive instruments upon a living child, in order to preserve the mother, be afflicting to the professional man, who is acquainted with all the dignity of his office, how much must it distress him to repeat every year the same sacrifice in favour of the same woman, and sometimes in favour of several women, when he practises in a large city, like Paris, and has acquired so much celebrity as to be called upon in the most difficult cases ? If the last resources, which we have to examine here, were as destructive to the mother as crotchets are to the child, marriage ought to be prohibited by wise laws to women so far deformed as to be unable to bear a living child. These laws would spare the virtuous man the pain of finding himself constrained sometimes to commit a sort of crime, greater, it is true, against nature than society, solely because he exercises a beneficent and consoling profession. So far from prohibiting the Cæsarean operation, other laws should oblige us to perform it, if we can demonstrate, that this operation is the only one, which can preserve the child without being essentially fatal to the mother.

" The death of the child is the only circumstance, which can authorize the use of the crotchet and other instruments of this kind : but how can any certainty of this be acquired, whilst it remains in the womb, and the finger can scarcely touch a single point of its surface, since it is sometimes difficult to obtain this certainty in a new-born child, though exposed to our view, and capable of being examined every where by the touch? When its death is recent, and putrefaction has not taken place, we should always be afraid of being deceived. How often, after strong appearances of the death of the child, have we heard its moans, when just torn from the womb of the mother by a barbarous practice, at most excusable only in the first ages of the art? How often have we seen the scattered and palpitating limbs accuse this then destructive art, or the practiser of it, of a wicked attempt, which is so

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much the more shocking, as none of the laws that protect innocence, can punish it? Admitting that it is easy to acquire a certainty of the death of the fœtus, and consequently, that the instruments, of which we are treating, will have to act only upon a dead body, it is painful to recollect, that we may still meet with cases, wherein it will be necessary to have recourse to other means, notwithstanding this perfect conviction; those, for example, where the diameter of the pelvis does not exceed six, twelve, eighteen, or even twenty lines: for it is easily proved, that crotchets are then inapplicable."

We have selected this part for our readers, as embracing the principal reasons for performing the Cæsarean operation: as to the probability of success to be expected from it, we shall have occasion to inquire on reviewing the Appendix by the learned translator of these Memoirs.

Mons. Baudelocque next considers how far bringing on premature labour by a rupture of the membranes may be efficacious; the cases proper for which being now generally understood, we shall pass over, as also his reasoning on the Sigaultian operation, the merits and demerits of which he judiciously appreciates in the following passage:

"We know very well, at this time, what may be hoped for from the section of the pubes, and what may be dreaded from it, because we know to a single line, how much a given separation of the ossa pubis can add to each diameter of the superior aperture, and how far it will destroy the integrity of the sacro-iliac symphyses; the advantages resulting from the operation to the fœtus, and the dangers to the mother depending on the degree of increase of the diameters. We are no longer ignorant, that a separation of the ossa pubis to the extent of two inches and a half, for example, in adding more to the diameter, which was at first only two inches considered from pubes to sacrum, than to that which was three inches, became also more dangerous, in as far as it occasioned greater mischiefs in the sacro-iliac symphyses; and that the pelvis which receives the greatest increase, does not thence become more proper for the free transmission of the child, than one which receives a slighter augmentation."

The author has taken great pains to collect cases of the Cæsarean operation, and presents above seventy to the reader; about thirty of which were attended with success; and he very candidly remarks: "All these facts do not equally establish the absolute necessity of the Cæsarean operation, and we are very far from applauding indiscriminately all these successes;

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for it might have been dispensed with in several of the cases just related: but they incontestably prove, that this operation is not essentially mortal, and that the danger which accompanies it, frequently depends less on the importance of the parts interested by it, than on the accidental circumstances which afterwards present themselves; circumstances which have not always been well attended to by practitioners, and in the cure of which they have not had the courage to deviate for a moment from the ordinary rules prescribed for the treatment of large wounds of the abdomen. With that boldness, founded on information, which Mr. Bacqua has shewn at different periods of the cure of the female who is the subject of his observation, we might undoubtedly have obtained more success from the Cæsarean operation. If he had not taken care every day to destroy the adhesions of the parts that kept the effused fluids far from the wound, and opposed their discharge; if he had not introduced a catheter into the deep-seated collection of matter, which threatened the most dreadful consequences; Mr. Bacqua, like many others, would have failed in attaining the end which he proposed to himself, and would have furnished an additional arm to the adversaries of the Cæsarean operation, in making them acquainted with another victim."

In the second Memoir some other cases of successful and unsuccessful cases of Cæsarean operation are presented, in order to introduce an idea of Mons. Tarbes, who recommends the introducing a canula per vaginam into the uterus, in order to secure a free discharge for the lochia, &c. and for the purpose of injection after the operation. Mons. Baudelocque very properly objects to this plan, from the little advantage that is likely to result from it.

The most valuable part of the work is the Appendix by the translator, who candidly brings forward two more cases of the fatal termination of the Cæsarean operation. The first was performed by Mr. John Bell, of Edinburgh, who attributes the death of his patient to an internal hemorrhagy; the second, by Mr. W. Dunlop, of Rochdale. The obstacles to the cure in this instance are very clearly and justly ascribed to a most deplorable state of malacosteon; and the author justly remarks, that "the number of fatal cases of this kind, that have been recorded and collected, is now so great as almost to preclude every hope of preserving the life of a mother affected with malacosteon, by the Cæsarean operation. The lips of the external wound, though kept in the most perfect contact by means of sutures and adhesive plaisters, shew little, or no, disposition to heal by the first

first intention: and the effects of the inflammation, arising from the incomplete state of the abdominal cavity, and the injured and exposed state of the viscera, cannot be long supported by these feeble and nearly exhausted symptoms."

If these arguments be admitted, and we see no reason to the contrary, we certainly ought not to think of performing the Cæsarean operation in the majority of the few instances, even where it is supposed to be necessary: if the greater number of cases of distorted pelves arise from malacosteon, and the supposition is more than probable, it must be downright madness to hope for the recovery of a patient whose powers have been previously allowed to be scarce able to maintain the constitution under a state of disease. The propriety of the operation therefore, in most cases, will depend on the comparative value of the life of the mother and child, a question which is not discussed in this pamphlet.

In Section III. on the Causes, Cure, and Prevention of Malacosteon, the author takes a view of the composition of bone, as ascertained by the experiments of the best chemists, and proposes the following means as most likely to remedy the deficiency of phosphate of lime as the cause of rickets, and prevent the developement of oxalic acid, and re-establish the combination of the phosphoric acid with the base of bones; a combination to which they owe their solidity:

"1. *To support and increase the vigour of the system*, by a nutritious diet, moderate exercise, free air, cold or tepid bathing, tonics, &c.

"2. *To supply the system with the substances that enter into the composition of bone, and give them their firmness.* For this purpose we may give burnt bones or burnt hart's horn, finely powdered, or phosphate of lime formed by the mixture of phosphate of soda and muriate of lime, which has the advantage of being more finely divided than can be done by mechanical means: or we may exhibit phosphoric acid and lime-water in succession; or phosphate of lime dissolved in the phosphoric, acetous, or muriatic acid, and afterwards lime-water; or we may give phosphate of soda, and afterwards muriate of lime. The administration of these remedies may not appear so likely to prove serviceable in this disease, as in *rachitis*; but, as a portion of the phosphate of lime, &c. has been already carried out of the system, the introduction of an additional quantity seems necessary to supply this defect.

"3. *To relieve pain* by internal remedies, as opium, and by external applications, as stimulating embrocations, blistering, issues, &c."

"4. *To*

"4. *To prevent deformity, or to redress or lessen the distortion of the bones, that has already taken place.*

"This to be effected by a recumbent posture, by the use of crutches, or a chair with stuffed moveable arms, and other mechanical contrivances."

"To prevent too frequent conception.

"To avoid nursing, or to shorten the period.

"To support the strength by nutritious diet, &c.

"To exhibit the phosphate of lime ready formed, or its constituent parts, during pregnancy and nursing."

A section is added on the Character, Synonyms, &c. of Malacosteon, and experiments on the urine of patients in this disease; and he has given six outlines exhibiting specimens of its formidable effects respecting the Cæsarean operation. Although we conceive the question not fully decided, we have no hesitation in recommending the work to the careful perusal of our readers.

ART. VI. *Synoptical Tables of Chemistry, intended to serve as a Summary of the Lectures delivered on that Science in the public Schools at Paris.* By A. F. FOURCROY, Member of the National Institute of France, Counsellor of State, Professor of Chemistry at the Museum of Natural History, at the Polytechnic School, and the School of Medicine. Translated from the original French by WILLIAM NICHOLSON. Royal folio. Twelve Tables. CADELL and DAVIES, London. 1801. Price 1*l.* 1*s.*

IN a notice respecting the object and execution of these Tables, the author informs us, that he has long meditated the plan of offering to the students of chemistry the elementary notions of that science, in the form of very concise outlines, and more particularly of disposing them according to the methodical series of ideas in which he has succeeded in arranging them, after the labour of twenty years, in order to communicate them to the pupils who attend his lectures.

His treatise on the "Philosophy of Chemistry," which was published several years ago, is the execution of the first part of this plan; and the Tables which are now before us constitute the second part.

In the Philosophy of Chemistry, his aim was to present, in the form of axioms, and as primitive and fundamental truths, the most *general* facts of the science, the most extended phenomena. In that work he tells us, it was his intention

tention to offer to the contemplation of studious men, the first abstract elements of chemistry; and it is nearly independent of each individual or particular body, that those philosophical and elementary notions were conceived and drawn up. They can be applied only to the classes, or, at most, to the genera of bodies; and though, in some instances, they are applied to certain particular substances, yet, in such cases, the substance itself is considered as representing an entire class of bodies, and as possessing an influence, with regard to the proper knowledge of its habitudes, upon the knowledge of those of many other bodies.

The Tables which he now presents to the public, form, he observes, the true continuation of the "Philosophy of Chemistry." They contain the properties of bodies in particular; they present the applications of general principles, or of the philosophy of the science, to the study of the productions of nature and of art. They present the developement of these principles as to what may be termed the individual chemistry of bodies: and though the number of Tables amounts only to twelve, they will, he thinks, be sufficient to direct the student through the whole chain of chemical phenomena, which are observed in all the substances comprehended under the dominion of nature.

These Tables are, in a certain respect, Synoptic Tables of the author's "General System of chemical Knowledge," of which we are glad to hear that a translation by Mr. Nicholson is now in considerable forwardness. He has confined them to the number of twelve, that he might present a more condensed sketch, and, in some measure, render more permanent the basis of the methodical division, which he has adopted for the study of the chemical properties of bodies. We shall present our readers with a view of their contents, taken from his "Notice," which is all that our limits will permit; and, indeed, all that can be expected in the review of a tabular work.

The first Table contains the generalities of the science; an exposition of the order adopted; an outline of the means, the history, the divisions of chemistry, and particularly the grounds of the application which may be made of this science to the art of healing; these Tables, the author informs us, being originally drawn up for the instruction of the pupils of the School of Medicine at Paris.

The second Table presents, 1st, the first class of simple, or undecompounded bodies, disposed, some according to their

mass

mass and abundance, such as light, caloric, oxygen, and azote; others according to the order of their combustibility, or attraction for oxygen, viz. hydrogen, carbon, sulphur, diamond, and the metals: 2d, the preceding bodies burned or combined with oxygen; or the series of oxides and acids, classed according to their attraction for the burning principle, and their difficulty of being decomposed.

The third Table, like the preceding, is devoted to two different objects. In the first department, the salifiable bodies are exhibited, comprehending the earths and alkalies; disposed, the former beginning according to their properties as being most eminently earthy, and proceeding to those which exhibit alkaline properties; the second, according to the force of the alkalies, beginning with the most powerful. M. Fourcroy has placed among the alkalies two substances hitherto regarded as earths, viz. barytes and strontian; because, in fact, they possess very decided alkaline properties, and a great force of attraction.

The conclusion of the third, the fourth, and fifth Tables are devoted to the salts. In these tables it is that we see to the greatest advantage the benefits resulting from our author's method of classification, according to which the most eminent among their chemical properties may be found in the classification itself. The salts, composing at present more than an hundred species, instead of twenty, which constituted the sum of our knowledge thirty years ago, have become one of the classes of bodies with which chemical science ought most eminently to engage itself; because they must be considered either as important agents in the operations of the art, or as the materials of natural phenomena, or artificial productions. In these Tables, the division of genera and species, their classification and relative disposition, comprehend the whole of the most useful properties; and, together with their methodical nomenclature, represent the greatest part of their chemical history.

The sixth, seventh, eighth, ninth, and tenth Tables, comprehend the metals. The sixth exhibits, first, the metallic properties in general. The four following contain, in succession, and disposed according to three of their chief physical and chemical characters, the twenty-one metallic substances hitherto known.

With regard to the two last Tables, the eleventh, on vegetable chemistry, and the twelfth, on animal chemistry, they can be considered only as sketches or outlines, intended rather to

to exhibit the author's method of treating organic matters, than to shew their chemical properties in detail. The important and characteristic properties of these bodies are, nevertheless, presented in such a manner, as will give an accurate notion of them to the student. The author has not thought proper to give the history of vegetable and animal substances at length, because it would have required a great number of tables to exhibit the new discoveries. But notwithstanding the conciseness of the two last Tables, we find the most striking and newly-discovered facts of vegetable and animal analysis announced in such a manner, as to leave little unknown in that respect, as well as their principal applications to the philosophy of plants and animals.

The author informs us, that he intends to offer to the public, in another series of tables, a methodical and abridged exposition of the properties of animal substances, which it is of so much importance to present in a connected arrangement, and to render them familiar to such as direct their studies to the philosophy of animal bodies, and the different branches of the healing art. We sincerely hope that nothing will happen to prevent the speedy execution of his design, and are confident, that, if they resemble the present Tables, they will be read with avidity.

FOREIGN BOOKS.

Art. VII. *L'Art de procréer les Sexes à Volonté; ou Systême complet de Generation:* i. e. *The Art of begetting either Sex at Pleasure; or a complete System of Generation.* By J. A. Millot. Octavo. 384 pages, with plates.

Generation is one of those mysteries which Nature has hidden by a very thick veil, and whereon hypotheses and multiplied experiments have scarcely been able to throw any light. The author of this work has made a great number of researches, which he has arranged methodically, and accompanied with judicious reflections. He adheres principally to the oviparous system, which, after attempting to establish it by direct proofs, he shews to be the only one which can afford us any information respecting the secret of generation. He afterwards developes his ideas respecting the existence of germs, the mode of human fecundation, the formation of the sexes,

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the sanguification of the fœtus, the birth of hermaphrodites, and on resemblance and unlikeness.

The work concludes with some critical observations on the discoveries of Spallanzani. [*Journal Gen. de la France.*

ART. VIII. *Manuel de Medecine-practique; Ouvrage elementaire: auquel on a joint quelques Formules à l'Usage des Chirurgiens, et des Personnes charitables qui se dévouent au Service des Malades dans les Campagnes.* Par Le Cit. GEOFFROY. i. e. *A Manual of practical Medicine; an elementary Work: to which are added, some Formulæ for the Use of Surgeons, and such charitable Persons as devote themselves to the Service of the Sick in the Country.* Paris. 2 vols. large octavo. 6 livres.

THE intention of this author was not to produce a learned treatise, but an elementary work for the use of medical practitioners, who often are employed in the country before they have acquired sufficient instruction in the hospitals; he has consequently suppressed whatever had not an immediate connexion with his object, as the theories, the etiology of disorders, &c. He confines himself to explain the diagnostic signs of diseases, and has prescribed the safest method of treating them. Every article is accompanied with some recipes, to be varied according to the age, strength, and constitution of the patient.

The work is divided into two parts; one containing instructions for acute diseases, the other those which have for their object the knowledge and treatment of chronical diseases. This part is subdivided into two sections: 1. Of acute Diseases—2. Of inflammatory Diseases.

The Second Part is composed of ten sections. The first three treat of chronical Diseases—4. On Diseases by the Collection of Pus, or purulent Diseases—5. Of Diseases by Condensation of the Lymph—6. Of Diseases by Putrefaction or Mortification of the Parts—7. Of Diseases by Increase of Evacuation—8. By Suppression of Evacuation—9. Of Diseases occasioned by the Acrimony of the Humours—10. Of comatose Diseases—11. Convulsive Diseases—12. Of Poisons and venereal Diseases.

On reading this division of his matter, we easily perceive, that in the titles to the different chapters, and even in the order of the classification, Cit. Geoffroy has thought himself obliged more than once to sacrifice philosophical correctness to custom and vulgar expressions. He informs us of this in the begin-

beginning, and in fact, speaking to men of little information, he was necessarily obliged to adapt his phrases so that they might easily find in his work the word to which they had been used, to affix the idea of the disorder for which they were to seek a remedy.

Every article of this treatise contains first a short but exact description, in which the author confines himself to explain the characteristic symptoms of the disorder.

[*Journ. Gen. de Lit. Franç. & Mag. Encyc.*

ART. IX. *De la Nature et de l'Usage des Bains.* Traduit de l'Allemand de H. M. MARCARD. i. e. *Of the Nature and Use of Baths.* Translated from the German of H. M. MARCARD, by M. PARANT. Large octavo. 290 pages. 3 liv. 60 cent.

THIS work of Dr. Marcard, which is the result of his numerous experiments, ought to be made known. His translator boasts of an exactness in the translation, so as to have rendered every expression of the author's, as far as possible, by a correspondent expression, and has thought it his duty to sacrifice the merit of style to that of fidelity. It is divided into twelve chapters, viz. 1. The History of the Difference and Division of Baths, according to their Degrees of Heat—2. Of hot or warm Baths—3. Of the Relaxation or Weakening attributed to hot Baths—4. Hot Baths, are they heating?—5. Of the Effects of Baths in general on the Pulse and on Respiration—6. Observations on the Effects of warm Baths on the Pulse, and on Respiration—7. Of the Effects of hot Baths on Pains, Spasms, and Sleep—8. Of the Effects of Baths on the fluid Parts of the Body and on the Vessels, with Reflections on the humoral Pathology—9. Some other real or presumed Effects of Baths on the Body—10. Of very hot Baths—11. Of Vapour Baths—12. Of cold Baths. [*Jour. Gen. de la Lit. Franç.*

ART. X. *Recherches et Descouvertes sur la Nature du Fluide nerveux; ou de l'Esprit vital, Principe de la Vie, et sur la Maniere dont il agit, d'après des Expériences nouvelles et exactes.* Par J. LEFEBURE. i. e. *Inquiries and Discoveries on the Nature of the nervous Fluid, or the vital Spirit, Principle of Life, and on the Manner in which it acts, agreeably to new and accurate Experiments.* By J. LEFEBURE. Octavo. 100 pages. 1¼ liv. [*Journ. Gen. de la Lit. Franç.*

ART. XI. *Essai sur le Calorique; ou Recherches sur les Causes physiques et chymiques des Phénomènes qui présentent les Corps soumis à l'Action du Fluide igné; avec des Applications nouvelles relatives à la Theorie de la Respiration, de la Chaleur animale, de l'Origine des Feux volcaniques, &c.; suivi d'un Essai particulier sur les Anomalies d'Affinités chemiques; d'Experiences et d'Observations sur le Metal des Cloches: enfin, d'une Description de la fameuse Aluminiere de Souvignaco en Istrie, et des Procédés employés pour l'Extraction et la Purification de l'Alum naturel:* i. e. *Essay on Caloric; or Inquiries into the physical and chemical Causes which Bodies submitted to the Action of the ignited Fluid, present; with new Applications relative to the Theory of Respiration, of animal Heat, of the Origin of volcanic Fires, &c.; followed by a particular Essay on the Anomalies of chemical Affinity; of Experiments and Observations on Bell-metal: lastly, a Description of the famous Alum Mine of Sovignaco in Istria, and of the Processes employed for the Extraction and Purification of native Alum.* By TH. LOCQUET. Paris. Octavo. 473 pages. 5 livres.

PHYSICIANS are yet very far from agreeing as to the nature of caloric, and of the phenomena attributed to it. In this volume M. Locquet has published eight essays on that subject. The first treats of caloric, considered with respect to its philosophical and chemical connexion with other bodies; from whence we may deduce the principal phenomena which these present when submitted to the action of the fluid, such as their capacity for caloric, their dilatation, fusion, *gazification*, tendency to equilibrium, of temperature, &c.

In the second essay the author treats of the cause of the perpetual productions of caloric by the friction of bodies, and of the consequences that Count Rumford has deduced from his own experiments.

In the third he treats of the conductive power of liquids for caloric.

The fourth contains new views on respiration, and of the cause of the production of heat in hot-blooded animals.

The nature of volcanic fires forms the fifth essay. The author considers the cause of them as independent of any local combustion whatever, and produced by the decomposition of water, or of any other oxide, or by submarine or terrestrial currents of air.

The sixth essay contains seven cases of chemical affinity; 1. affinities called predisposing; 2. decomposition of sulphat of

4 iron

iron by caustic ammonia; 3. decomposition of muriat of potash by the sulphat of magnesia, or the Réaumurien zero; 4. reciprocal decomposition of the alkaline phosphats by carbon, or of the carbonated alkalies by phosphorus; 5. decomposition of water in the dissolution of iron by the diluted sulphuric acid, and the decomposition of the same acid, and not of water, on the dissolution of mercury by the same solvent; 6. precipitation of the free sulphuric acid by a mixture of the two sulphates of mercury and ammoniac; 7. he inquires whence it arises that the proportion of dissolvents, the last fixed on their bases, separate easily, while the first, although of the same nature and fixed on the same body, adhere with much more tenacity.

The author's residence in Italy having furnished him with an opportunity to traverse almost all the provinces of the ci-devant Venetian state, and some other countries dependent on Austria, he has had an opportunity of visiting many rich and interesting manufactories. The vast alum-work of Souvignaco in Istria, of which there does not exist any account, (probably because of its distance and secluded situation, or by reason of its short existence,) has afforded him some curious details, as well of the nature and disposition of the aluminous mineral, as with respect to the simple, ingenious, and partly new process pursued there, and of the theory of the manifold phenomena which it presents. It is the subject of the seventh essay.

The eighth and last essay gives a *precis* of his experiments on the extraction of pure copper from bell-metal, of which many Italian journals have already published the result, with some other experiments which he made at Venice on various objects of art, particularly of the separation of potash from marine salt*. The corrections, or rather the additions, proposed by the Chev. Napione, to the processes already known, with respect to the decomposition of the different species of bronze, were too interesting for the author to neglect making them known in detail, the more so, as, by repeating himself at Turin the experiments of this learned mineralogist, he had been more assured of their utility. [*Journ. Gen. de la Lit. Franç.*

* See Opuscoli scelti sulle Scienze e sulle Arti. Da Carlo Amoreti. tom. xx. Melano.

ART.

ART. XII. *Journal de la Société des Pharmaciens de Paris; ou Recueil d'Observations de Chemie et de Pharmacie publié pendant les Années* 6, 7, *et* 8: i. e. *Journal of the Pharmaceutical Society of Paris; or a Collection of Observations on Chemistry and Pharmacy, published during the Years* 6, 7, *and* 8. By Citizens FOURCROY, VAUQUELIN, PARMENTIER, DEYEUX, and BOUILLON LA GRANGE. Quarto. 15 livres.

WE here find a great number of new facts on the preparation of medicines, on the chemical phenomena applicable to the arts, and to domestic economy. The work is particularly useful to physicians and apothecaries, and also to manufacturers and amateurs. It forms an indispensable companion to the Annales de Chimie, which will hereafter comprehend the continuation of this Journal.

[*Jour. Gen. de le Lit. Franç.*

ART. XIII. *Histoire Naturelle des Mineraux.* Par E. M. L. PATRIN. Edition ornée de 40 Planches, representant un plus grand Nombre de Sujets desinées d'après Nature par J. E. DESEVE, et gravées sous sa Direction. i. e. *A Natural History of Minerals.* By E. M. L. PATRIN. Ornamented with 40 Plates, representing a great Number of Subjects, designed by J. E. DESEVE, and engraved under his Direction. 5 vols. large 18mo.

THE discoveries made in mineralogy since the death of Buffon, required that considerable additions and corrections should be added to his celebrated work. Cit. Patrin, who has undertaken to continue and complete the *History of Minerals,* has not contented himself with consulting the labours of modern chemists; he has also added some valuable observations which he has had an opportunity of collecting during a journey of eight years, from European Russia to as far as, and beyond, the meridian of Pekin.

He divides the subjects on which he treats into *minerals and metals.*

In the first rank he places the eight simple and known earths, *siliceous, aluminous, calcareous, magnesia,* and those newly discovered, *barytes, strontian, zircone,* and *glucine.* He afterwards proceeds to the examination of the principal elements which enter into the composition of the primitive rocks, such as *quartz, felds-path, mica;* and afterwards treats of the rocks themselves,

as

as of granite, porphyry, &c.; of precious stones, and of other crystals found therein; of siliceous substances not crystallizable, such as agates, jaspers, &c.; and concludes by observations on the *secondary* and *ternary* strata of the earth, and of the materials they hold, as calcareous stones, marl, chalk, clay, and pudding-stone, sand, and free-stone.

We know that the number of metals is now increased to twenty-one: after having studied those which are the least distant from the earthy state, he proceeds to those which have a greater metallic perfection, a perfection which appears particularly to consist in their ductility, and a facility in parting with their oxygen. He points out the places in which the mines are to be found, the rocks which contain them, the substances which accompany them, the principal chemical properties of each metal; and the various uses in which they may be employed. He concludes by remarks on volcanoes, volcanic matters, houille, the bitumens, sulphur, fossils, always shewing the connexions these various mineral substances have with the general history of the globe.

The author's method is as simple as it is luminous. The work is enriched with a great number of detached memoirs, and his results are often placed in a point of view proper for the instruction of pupils. [*Journ. Gen. de la Lit. Franç.*

ART. XIV. *Traité complet sur les Symptômes, les Effets, la Nature, et le Traitement des Maladies syphillitiques.* Par F. SWEDIAUR. i.e. *A complete Treatise on the Symptoms, the Nature, and the Treatment of syphilitic Disorders.* By F. SWEDIAUR. Fourth Edition, corrected and augmented. 2 large vols. octavo.

THE third edition of this work appeared about two years ago; and this edition presents much amelioration, some considerable additions, and some entire new chapters; and where there is any mention of oxygenated remedies, it has been entirely new written, and the utility of these medicaments in venereal maladies has been determined and justly appreciated. This work presents every where, and especially in the first volume, proofs of exact anatomical knowledge, and especially of the modern discoveries in the absorbent system. The first volume, which treats of the effects of the syphilitic virus on the organs of generation in the two sexes, is

is concluded by a syphilitic pharmacopœia. In the second the author examines the effects of this virus, on the whole system of the animal economy. [*Journ. de la Lit. Franç.*

Art. XV. *Gesundheits-Taschenbuch:* i. e. *The Manual of Health for the Year* 1781. Published by a Society of Physicians at Vienna. Octavo. With a Portrait of Dr. Brown. Vienna.

THIS work would have lost nothing of its value, if it had been published in a form more agreeable to the matter contained in it; but the Germans must be taught the sciences by almanacks, as the French are by dictionaries. This practice may be very convenient to those who seek only for a superficial knowledge; but the learning in such books, and of those who consult them, is equally bounded. However, we shall present our readers with the contents of this medical pocket-book:—1. Biography of Dr. Brown, with an Exposition of his Doctrine, by *Joseph Frank*, first Physician to the Hospital of Vienna—2. On the vaccine Inoculation, by Dr. *De Carro*—3. The Causes of the great Number of pulmonary Phthisis in large Cities, particularly Vienna, and the Means of curing them, by Dr. *Martin Schmid*—4. On the Influence of the present Dress of Women on their Health, by *Joseph Frank*—5. Commentaries on the Ideas of Treatment and Cure, by *J. A. Schmidt*—6. On the Influence of Heat and Cold on the Preservation of Health, and on the Cure of Disorders, by Dr. *Werner*—7. On the Influence of Smells on the Health of the human Body, by *Cappellini*—8. On the pretended Preservatives taken in Spring—9. Fragment of a Regimen for Winter, by *Wagner*—10. On the Influence of the Custom of Bleeding and Purging, by *J. Malfatti*—11. History of a Person who had a Hole in his Stomach, visible on the Outside, and who, nevertheless, enjoyed a good State of Health—13. On the Mortality in the Hospital of Vienna, by *Joseph Frank.* [*Journ. de la Lit. Etrang.*

Art.

ART. XVI. GERARDI SANDIFORT *Tabulæ anatomicæ.* Folio maj. Lugd. Bat. apud S. et J. LUCHTMANS. 1 vol. i. e. GERARD SANDIFORT'S *Anatomical Tables.* Large folio. Leyden.

THIS work of a young and learned man is worthy of the attention of anatomists. It will appear in numbers, but at no fixed period; the second number is already in the press. The plates are very well engraved, and the drawings made by the author himself from nature. The present number contains two plates, *sistentes aneurysma arteriæ iliacæ internæ rariorum ischiadis nervosæ causam.* [*Journ. de la Lit. Etrang.*

ART. XVII. *Allgemeine Medizinische Annalen des Jahrs* 1800: i. e. *General Annals of Medicine for the Year* 1800. In large quarto. Altenbourg.

THIS journal is intended to appear monthly, in numbers of six sheets each, as a continuation of the *Gazette de Medecine*, which had met with so much success. The plan of the editors embraces, 1. The theory of medicine; 2. Practical medicine; 3. Medical correspondence; 4. Medical literature; 5. Notices and information.

The number for September 1800 contains, 1. Observations on the System of Brown, by *Cappel*—2. Inquiries into the Nature and Treatment of chronical Maladies, by *Horn*—3. Account of the vaccine Inoculation—4. Observations on the Pemphigus major, by *Hall*—5. On the Erysipelas, by *Wells*—6. Description of the Causus, a Disorder of the East Indies, by *Gillespie*—7. Treatment of the yellow Fever, by *Crauford*—8. On the Effects of the Digitalis purpurea, by *Mossman*—9. Extract from the Memoir of *M. Foderé* on the Goitre and Cretinism—10. A Tetanus cured by a plentiful Use of Wine, by *Hosack*—11. Pathological Phenomena of the Brain, by *Blane*—12. Observations on Melancholy, by *A. Erhard*—15. Some surgical Observations and Notices.

The number for the month of October contains, 1. Inquiries respecting the Effluvia from human Bodies, and on their Tendency to be converted into morbific Matter, by *Mitchell*—2. Medical Topography of the Country of Zerbst—3. On the Nature of pestilential Disorders, by *Webster*—4. On the vaccine Inoculation—5. On the Measles, by *Widekind*—6. On the

Efficacy of the Digitalis purpurea in Phthisis—7. On the Effects of Oil in arthritic Disorders—8. The Jaundice cured by the continued Use of Mercury, by *Kerrison*—9. Several other papers on surgery and midwifery, medical extracts from different books, remarkable facts communicated to the editor by his correspondents, and notices of new works.

[*Journ. de la Lit. Etrang.*

Art. XVIII. *Journal der Erfindungen, Theoricen, &c.:* i.e. *A new Journal of the Discoveries, Theories, and Contradictions, in Natural History and Medicine.* N° 8. Octavo. Gotha.

THE greatest part of this number consists of a continuation of the history of Brown's system, and of its influence on the system of medical practice by Wiedeman. It concludes with some observations on the principle, *ubi irritatio ibi affluxus.*

[*Journ. de la Lit. Etrang.*

Art. XIX. *Magazin der Heilkunde:* i. e. *Magazine of Medicine.* Vol. IV. N° 3. Frankfort.

POLEMICAL memoirs on many objects of medicine and surgery, on the system of Brown, &c. compose this number; the editor has added a memoir on the healing powers of nature, or an inquiry into the principles of *therapia.*

[*Journ. de la Lit. Etrang.*

Art. XX. *System der praktischen Heilkunde:* i. e. *System of practical Medicine.* By C. W. Hufeland. Part I. Octavo. Jena.

THE author intends that his work should serve as a basis to his course of practical medicine. This first part contains general therapeutics. Every where he endeavours to revert to simple principles, and to explain the phenomena of disorders, and the effects of remedies, from the laws of organic life: he supplies all deficiences by principles founded on experience, and presents to observers such considerations as are worthy of their attention. [*Journ. de la Lit. Etrang.*

ART. XXI. *Beitræge zur Medizinischen klinik:* i.e. *Observations on clinical Medicine, made during a Journey in Germany, Switzerland, and France.* By E. HORN. Octavo. Brunswick.

THE first volume of this work contains inquiries and observations on *fevers*. The author, who is of the Brunonian sect, examines the principles of our knowledge, and the treatment of those disorders, which constantly manifest themselves by an alteration in the pulse, and in the natural functions. He afterwards, in seventeen chapters, examines the new opinions on the nature and the varieties of fevers, and inquires what has been the cause of admitting so great a variety of different fevers, which ought not to be regarded as such. The ninth and tenth chapters present some observations on the necessity of varying the treatment of fevers according to the periods, and on the impossibility of adopting a general treatment. The other chapters offer some remarks on fevers produced by excess of action in the system, combined with an inflammation in the breast and other exterior local affections; on fevers arising from a diminution of strength in the system, and on their varieties; on fevers from the first to the fourth degree of debility. The symptoms are correctly detailed, and those which are only secondary are distinguished from such as are primary. The modes of treatment are examined from practice, and from the happy or unfortunate results of their application.

The second volume speaks of the nature and treatment of chronical diseases. The author first examines the application of the theory of the alteration of the humours, to the nature and treatment of chronical diseases. He afterwards passes to a critical examination of the theory of the *metastases*; of that of the suppression of the secretions, and of its influence on the treatment of chronical disorders; of that of a general or local plethora, and of its influence on the treatment; of that of the obstruction of the viscera, (infarctus,) and of its influence. The author next presents some critical observations on the complication of chronical disorders with excess of sensibility or irritability, and some researches into the theory of the same chronical maladies, with respect to their nature and treatment. The most natural classification of these disorders seems to be, 1. Chronical diseases arising only from weakness; 2. From weakness combined with disorganization. The first of these classes is divided into three species, viz. 1. Into chronical diseases arising from a general weakness, equal

every where; these are very few: 2. Into chronical maladies caused by a general weakness combined with a local weakness in one or several organs; this is the most common, and produces hemorrhages, dropsies, apoplexies, convulsions, &c.: 3. Into chronical disorders, which have their origin in local weakness, or particular organs; these are the least frequent of all. The author concludes with a prognostic of these disorders, and the methods of cure. [*Journ. Gen. de la Lit. Etrang.*

MEDICAL INTELLIGENCE.

Art. 22. *Mr. Paget on the Use of Belladonna in extracting the Cataract.*

IN the thirty-second Number of the Medical and Physical Journal, Mr. Paget, Surgeon to the Leicester Infirmary, confirms the account given by Dr. Reimarus of Hamburgh, and Dr. Grassmeyer of the same place, of the remarkable dilatation of the pupil consequent to the application of the diluted extract of belladonna. Mr. P. says, that he lately used it in three cases, previous to the extraction of the cataract; and although the result has not quite equalled his expectations, yet he is convinced it will be found of considerable use when experience shall have decided to what extent the application may be carried, without danger of evacuating the vitreous humour from too great a dilatation of the pupil. In the first case which occurred, he wished to make an experiment of the effects some days previous to the operation; and as no intimation was given by either of the gentlemen above alluded to, of the strength of the preparation employed, that important point he had to learn. Accordingly he diffused four grains of the extract, procured from Apothecaries' Hall, in one drachm of water, and six drops of this mixture were dropped into one of the eyes. The application gave no pain, nor produced any apparent irritation: but in about half an hour the iris was perfectly invisible, and the whole circumference of the opake crystalline completely in view. The effect, after this time, continued gradually diminishing; but the pupil was not reduced to the size of that of the other eye in less than three days. When the time was fixed for the operation, Mr. P. ordered three drops of the same strength to be put into the eye half an hour beforehand. Immediately on the application of the knife to the cornea, the iris shewed that its irritability

was

was not yet destroyed, for a contraction of the pupil immediately took place, but not to its natural size; so that plenty of room was left for passing the knife, and completing the incision, without injury to the iris.

The other cases were nearly similar in their result: the orbicular fibres of the iris were in a degree paralyzed by the diluted extract; but he did not find that it had any effect in quieting the muscles of the eye, or that it at all tended to prevent the rolling of the eye during the operation. He thinks this application particularly well adapted to the examination of the cataract previous to the operation, especially when we wish to ascertain whether the capsule be opake, or only the lens itself; and it may probably be found of use in other states of the eye, where an accurate examination of the parts posterior to the iris is necessary.

Art. 23. *Mr. Hope on supposed Superfœtation.*

In the same Number is a singular case by Mr. Hope, of a woman, who, in April 1800, in the seventh month of her pregnancy, was attacked with severe labour pains, which continued for three weeks without any expulsion of the fœtus; after they subsided, she complained of an exceeding hard, painful body, adhering to her right side, and which substance she could never after get removed, but continued hard, large, and painful. In the month of November following, she discovered symptoms of recent impregnation, and was delivered of a child in July last, of rather an unhealthy appearance, though Mr. H. believes it is still living. Other circumstances went on as usual in parturient cases till the end of near a fortnight, when she was seized with vomitings of stercoraceous matter, and died on the 9th of August.

On opening the body, after cutting through the peritoneal lining, the hard substance of which she had so long complained *was found to be the uterus*, which was about the size of a calf's bladder when distended with air, and perfectly green from putrefaction. Wishing to remove it entire, the operators were very cautious, as the substance was exceedingly thin; yet with all their attention the cavity was broken into, and there issued about a pint or more of nasty thick matter, of the consistence of molasses, and the colour of strong beer grounds, in which was a fœtus of between six and seven months, so macerated that it had scarcely sufficient solidity of bone to afford resistance; the ligamentary substance was pretty complete,

complete, as was the cord, and the placenta adhered to the superior part of the uterus with considerable firmness. Mr. Hope says, that a mistake, with respect to its being extra-uterine, is impossible, from the care taken in the examination; it is therefore brought forward as a proof of the reality of *superfœtation.*

Art. 24. *Progress of the vaccine Inoculation in Spain.*

M. Castillo, secretary to the embassy of Spain, an enlightened friend of the sciences; and M. Zea, a naturalist, pensioned by his Catholic Majesty; have lately introduced the vaccine inoculation at Madrid. The officers and ministers of state have been anxious to set the example, by submitting their children to this new kind of inoculation. The celebrated Mr. Alonzo, to whom natural history owes so much, accelerates the progress of this discovery, by assisting the physicians with all his means, and the credit which he derives from his place as Minister of Grace and Justice. M. Costa, a distinguished Professor of the Royal College of San Carlos, has been appointed to direct the operations; and M. Alonzo is to communicate the results to the learned Societies of Paris.

Art. 25. *Cow-pox in the sixth Century.*

Mavius, the first Bishop of Lausanne, speaking of the small-pox, *variola*, in the Annals of his own Time, observes, that it principally attacked horned cattle. This was in the year 570; and it does not appear to have attacked mankind till the year afterwards, namely 571. It will turn out very singular, if the same animal which first had this disease, should furnish man with the best preventive of this dreadful malady.

Art. 26. *Prof. Hufeland on Frictions with phosphorated Oil.*

Professor Hufeland has made several experiments, by applying a solution of phosphorus in oil, or naphtha vitrioli, externally in frictions, which were of very great service in obstinate rheumatic and arthritic pains, and in venereal pains of the bones; paralytic complaints and a venereal tumour were likewise much diminished by it.

Art.

Art. 27. *Mr. Carlisle's intended Work.*

Mr. A. Carlisle, surgeon, intends shortly to publish an extensive work on the Internal History, or Anatomy, of Animals in general; being an attempt to combine the knowledge of comparative anatomy with zoology, so as to render the study of both more interesting and more systematic. This work will be published in parts, the complete series of which cannot be finished in less time than three years; each part, however, is intended to form a separate volume on one distinct subject.

Part I. in quarto, illustrated with eight plates, from drawings by the author, will comprise an account of the physical and chemical properties of animal substances, as far as they have been ascertained, and a particular description of the internal history, or anatomy, of the class "Vermes" of Linnæus.

Throughout the whole work, it is the author's design to give the leading facts in detail, freed from technical expression wherever the subject will admit. Many of the descriptions will be entirely new, and all the authorities admitted, either upon the actual knowledge of their correctness, or their strict conformity with the author's experience. The figured representations, and the descriptions, are taken from recent subjects, as the parts were first investigated, either by way of preparation, or merely tracing of the arrangements. Such a mode of diffusing this kind of knowledge, the author hopes, will prove more useful than that of making anatomical collections, whose limits are very confined, and the objects preserved in them always lose a part of their distinctness which is to be observed in the recent animal structures. Mr. Carlisle's habits of attention to this subjeet, and his residence in London, where such variety of natural productions continually present themselves, are the pretensions on which he founds his expectations of public support. A copious prospectus will precede or accompany the first part.

Art. 28. *Mr. Blair's intended Work on Hospitals, &c.*

Mr. Blair is collecting materials for an Historical Account of all the Hospitals, Infirmaries, Dispensaries, and medical Societies in the Metropolis. Such a work is likely to be very interesting as well as useful.

The same gentleman intends likewise to deliver Clinical Lectures on the Diseases and Operations of Surgery. The surgical

surgical practice of two dispensaries will be open to the inspection of all the gentlemen who attend these lectures during the continuance of each course; and, as occasion shall offer, a small number of cases will also be set apart as illustrations of the doctrines delivered.

Further particulars may be learned by applying at Mr. Blair's house, Great Russel Street, Bloomsbury Square.

Art. 29. *Dr. Garnett's Lectures.*

Dr. Garnett having built a very commodious lecture-room adjoining his house, N° 51 Great Marlborough Street, intends to commence his lectures on Monday, November 2d, at eight o'clock in the evening. These lectures will consist of two courses: 1st, Experimental Philosophy, on Mondays and Fridays, at eight o'clock, P.M.—2d, Chemistry, on Tuesdays and Thursdays, at one o'clock, P.M. Each of these courses will be illustrated by experiments with a very complete apparatus. The Medical Lectures will not commence till January 1802.

THE

LONDON MEDICAL REVIEW.

VOL. VII. N° XXXIV. DECEMBER MDCCCI.

Art. I. *The Principles of Surgery, in two Volumes: Vol. I. Of the ordinary Duties of the Surgeon; containing the Principles of Surgery as they relate to Wounds, Ulcers, and Fistulas; Aneurisms and wounded Arteries; Fractures of the Limbs; and the Duties of the Military and Hospital Surgeon.* By John Bell, Surgeon. Cadell and Davies, London. Quarto. Price 4*l.* 4*s.*

THE labours of the reviewer and critic, in voluminous works like the present, are toilsome, difficult, and oftentimes unthankful. To give a concise view in the way of analysis, to point out the different excellencies, mistakes, or imperfections, according to the extent of our knowledge and judgment, is the task we assume between the author and his readers.

The volume before us contains 674 pages of neat letter-press, and eighty different-sized plates, some coloured, others plain etchings, executed in various manners, and occasionally small figures or vignettes inserted in the lettered page.

The Dedication is addressed to the Surgeons of London, and four of their names are selected in a manner not likely to please the others.

The style of the author is that of discourses or lectures, and the subjects on which he treats will be seen by the following

"*General Index of the first Volume.*

"Section I. *On Wounds, Ulcers, and the ordinary Duties of the Hospital Surgeon.*

"Discourse 1. A preliminary Discourse on the Education and Duties of a Surgeon.

"2. History of the Doctrine of Adhesion, with practical Rules and Inferences.

"Of ill-conditioned and complicated Wounds, of Ulcers, Dressings, Bandages, and the daily Duties of an Hospital Surgeon.

"4. Of Bandages.

"Section II. *Of Aneurisms and Wounds of the Arteries.*

"5. On Hæmorrhagy; an historical and practical Discourse on the Effects of Hæmorrhagy; the various Means of suppressing Hæmorrhagy; and the Doctrines of modern Authors concerning the Retraction of Arteries.

"6. On Inosculation; a general Sketch of the arterial System; of the Importance of the Inosculations to the general Health and Preservation of the Body; of the frequent Interruptions of the great Arteries, and of the retrograde Motions of the Blood.

"7. The History and Causes of Aneurisms.

"8. Of the Condition of an aneurismal Limb, from which is deduced the Safety or Danger of the various Operations for the Cure of Aneurisms.

"9. Of Wounds of the Arteries; of the Aneurism which forms over the wounded Artery; with general Instructions and Rules of Conduct for the Operation on great Aneurisms.

"10. Of the oblique Wounds of Arteries, with Rules for operating.

"11. Of the Aneurism from Anastomosis.

"Section III. *Of Fractures of the Limbs.*

"12. Of Fractures of the Limbs, containing general Theories.

"13. On the Anatomy and Accidents of the Hip Joint.

"14. Of Fractures of the Thigh Bone; and of the irresistible Contractions of the Muscles and Shortening of the Limb.

"15. Rules for the Management of simple, compound, and gun-shot Fractures, deduced from the Practice of the best

best Surgeons, and from the Doctrines explained in the preceding Discourses."

Neither the title of this work, nor the general heads of its contents already enumerated, give a clear idea of the various subjects descanted on. The term "principles" is, indeed, little suited to unsystematic arrangements and intemperate discussions. If the student of surgery is to imbibe elementary principles, either moral or professional, from books, with such pretensions as the present, they ought to be conducted throughout in a mild, sober, and plain language, far removed from impassioned sentiments or anecdotes, and still farther from personal cavillings with the cotemporaries, perhaps the rivals, of their author. That such rules have not been observed in collecting these "Principles of Surgery," is demonstrable from almost every page. In a book of such bulk and expense we were led to expect, at least, the ordinary refinement of language, and a degree of clearness as well as strict propriety in the use of terms. We are, however, disappointed in these hopes. Although influenced by no uncharitable dispositions towards an author for such deficiencies, when the matter and the manner unite as compensations; we proceed to exemplify each of these demerits from the work itself, with that freedom which our bounden duty to the public inspires, and which even the author himself cannot reprehend, more especially if he receives from us the advice he so strenuously urges to his readers; he "will feel a generous disregard of every thing but opportunities of doing good, and promoting to the utmost of *(his)* power the interests of humanity, of (his) profession, and of general science."

Such expressions as "whiffling agility,"—"sheer stupidity,"—"slush of poultice,"—with a multitude of equally low, provincial, or obsolete terms, are neither likely to enhance the reverence nor the respect of the world for the author's profession; and from such examples the student is not likely to gain any of those blandishments, or marks of politeness, which are pointed out as so needful and suitable to his future rank in society.

We differ also very widely from the recommendation so strongly enjoined in favour of the army, as a school "of practical science" and refined morals, and particularly from the slight manner in which the characters of army surgeons are treated. If those who hold the reins of the military and naval medical departments in this empire were not actuated by more distinct views of the professional qualifications of their several

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agents, in the different classes of subordination, check, and inspection, to which, we believe, they are subjected, then, indeed, would the public service in this most important part of it, exhibit a spectacle of inhumanity and horror disgraceful to any civilized state; but we know that the regulations of the medical superintendency do not admit "a military surgeon, while yet a young man," (to have) "the safety of thousands committed to him in the most perilous situations, (nor) to act alone and unassisted in cases where decision and *perfect knowledge* are required."

There is a degree of intemperance and extravagance in many of our author's representations, which cannot add to the conviction of his readers, whilst it has a tendency to diminish the value of whatever may be found substantial or correct in the other parts of his work.

Another striking fault in this large and expensive volume is the recital of much trivial matter from authorities which should not be indiscriminately quoted: of this description are the stories, hypotheses, and histories of cases from Ambrose Pareê, La Motte, Dionis, Albucasis, Talicotius, &c. &c.; these neither strengthen nor illuminate any argument in modern surgery. As precedents of past experience, much may be gathered from all such works; but to hold these up to the view of inexperienced, and consequently injudicious youth, is a dangerous mode of teaching, in the most moderate acceptation; and to fill modern books with the idle gossipings and reveries of the dark ages, which have had their day, been refuted and laughed at, is no proof of respect for the public good sense. "We may venture to affirm, that nothing has been more unfavourable to the improvement of our science, than this traditionary nonsense, delivered down from one system to another, passing from hand to hand, among formal book-makers." Page 197.

If our animadversions should seem in one strain of severity, it is wholly attributable to the want of any sufficient atonement, either in the way of strikingly intrinsic merit in the subject, or of moderation in the temper of our author towards his cotemporaries. In this general severity we are quite sure of the concurrence of our professional brethren; but an imperious duty towards the students who may possibly bestow some degree of confidence on our reports, creates a motive for our being faithful according to the best of our judgment, which is, and ought to be, paramount to all other considerations.

The plates are neither executed with skill, as pieces of art,

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nor with that clearness which all representations of this sort require. The subjects are seldom appropriate, and often superfluous; for example—a view of Edinburgh Castle, in the title-page vignette, and a chafing-dish with antiquated cauterizing irons; fourteen heads with bandages, caps, &c. &c. exhibiting grotesque or ludicrous expressions; whereas some of those parts which ought to have been finished with great care and skill, such as the diseased appearances of aneurismal arteries, the circumstances of their obliteration, &c. are in general so slovenly sketched, that no useful ideas can be gathered from them. We are sorry to say, that a desire to fill the work with showy pictures seems to have outweighed the more suitable consideration of making them useful illustrations.

We cannot do the author and the public strict justice in a better way, than by giving those quotations from the several parts of his book, which convey his leading opinions and doctrines.

Page 18. "Rules of practice form the sum total of our knowledge; but they are not the means by which knowledge is to be acquired. They enter slowly into young minds, and have but a slender hold on an imagination *unheated*, unoccupied with the subject, unconscious of the slow and gradual changes, the silent but important revolutions by which science has been improved. The rules which I shall require you to learn shall be founded on histories, theories, and facts. You shall not follow with servility the practice of myself, or of any master; your opinions shall be your own, the result of your own particular knowledge. I know both how to respect the difficulties and uncertainties which you must feel when first entering on study, and how to lead you onwards to a general knowledge of your profession by slow and gradual steps; and as for the absolute rules of practice, I will not play the pedant over you, but give you a due share in forming them for yourselves."

Again: "This reminds me of telling you, in the last place, how important it is to procure adhesion in the very first moment of a wound; for the longer this is neglected, the less is the part disposed to heal. A speedy adhesion saves pain and inflammation, prevents suppuration, wasting of flesh, a wide scar, and all the other deformities and distresses of an ulcerating wound. It prevents more serious ill consequences than pain and deformity; it prevents that bursting of arteries which is so apt to happen in an ulcerating sore, or that oozing

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of blood which is so much more difficult to command than the most impetuous bursting of sound arteries, and which is always an omen of something still worse approaching. The speedy adhesion of a wound prevents sleepless nights, diarrhœas, fever, and wasting of the flesh, and the accession of the hospital fever, or hospital sore. You do not know, after a battle, how soon your patient may be thrown into some foul hospital! nay, even in a stationary and well-regulated hospital, your patient may be seized with hospital fever, dysentery, or some other disease. If you once get the adhesion thoroughly accomplished before any such misfortune happen, your patient is, in some degree, safe; if you neglect the first moment of healing his sore by adhesion, it may never heal; if he lie but a few days in a foul hospital with an open wound, that wound becomes a sore; the sore is followed with diarrhœa, foul tongue, nausea, and thirst; he becomes sickly; the sore degenerates, he falls into a fever, and dies; his safety, his life, turns often upon this single point, of procuring a speedy adhesion." Page 73.

The Discourse (as it is called) on Adhesion, is subdivided into the following sections, viz.—On the Abuse of Tents—On sympathetic Cure of Wounds—Secret Dressings—Talicotian Doctrine—Modern Doctrines and *Practice of Adhesion*—Of Sutures—

Re-union of the Skin.
———— of Wounds of the Lips.
———————————— Face.
———————————— Nose.
———————————— Tongue.
———————————— Scalp.
———— of muscular Wounds.
Complicated Wounds where the Bones are injured.
Of saving a wounded Hand!!
Of re-uniting a compound Fracture.
Of cutting *the* Stitches.
Obstacles to Adhesion.

To pursue this author throughout the prolixity of his "Discourse," would be to incur the same fault with which we have charged him. The doctrines laid down are, in general, the same with those taught in every school; they are, to be sure, "heated," and probably, from that cause, are expanded beyond reasonable bounds. The practical remarks are often shrewd and correct, although literally conveyed in the language which our godfathers and godmothers are charged to instruct

us in. In addition, the superfluities and extraneous matters clog whilst they darken the results of his labours.

"When a limb is perforated with balls, or battered with great shot, or crushed in machinery, so that its bones are broken, perhaps protruded, its great arteries wounded, and all its fleshy parts, all its deeper muscles, bruised inwardly against the bones, it often falls into gangrene on the first days, or (if the patient escapes the first danger) into universal disease, the whole limb swells to that enormous degree which threatens gangrene; some parts are very highly inflamed, others slightly gangrenous; the cellular substance, and the interstices of the muscles, are filled with extravasated blood; and in consequence of this extravasation of blood the suppuration is dark-coloured, fœtid, and very foul; the skin is much destroyed, the openings numerous and fistulous, the bones carious, the fleshy or muscular parts of the limb wasted: these are inevitable dangers arising, not from the carelessness of the surgeon, but from the essential nature of the wound. Thus would I represent to you the various forms of a complicated wound; the diseases which ensue are among the most important in surgery, and, at the same time, the most neglected; surely, if any skill or conduct can save a limb from falling into this condition, that conduct, and the knowledge which it implies, must form a very serious part of the duties and learning of a surgeon." Page 77.

"I must truly confess, that while we are improved in all the great and difficult points of surgery, we are gone backwards in all the nice and delicate attentions, which are so necessary in the cure of wounds. When barbers affected the character of surgeons, surgeons were forced to imitate their methods of careful niceness in dressing, and became their rivals even in their own peculiar trade of dressing sores; but it seems as if, now that surgery has risen to its proper rank, surgeons were even at pains to depart as far as possible from the frippery of this manner, by which many useful methods have been lost, and the practice of common surgery become slovenly to a shameful degree. Long ago a surgeon could never do too much in the way of probing and searching wounds, tenting them to the quick, injecting them with balsams, and torturing the limb with injudicious bandages; but now a surgeon thinks he has done enough in clapping a plaster over a sore with the palm of his hand, or with clean hands he feels the pulse for form's sake, and orders the limb,

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without regard to its condition, to be laid in a mash of poultice." Page 78.

The reader will perceive, by the preceding quotations, something of this author's manner. We cannot but lament the disadvantage under which all his Discourses labour, from either carelessness or ill-judging loquacity. In this part some good practical observations are to be found, such as on the improper use of watery applications, poultices, &c. in recent wounds, and also the ill effects of long-continued watery applications on debilitated parts. These truths, we apprehend, are very well known, and they deserve to be enforced on the mind of the student. Respecting the babbling attentions exemplified in the story of the barbers just quoted, we apprehend such conduct is often assumed to impose on the feelings of the patient; and the affectation of tenderness, attention, and humanity, is the common trick of the meanest empirics. A dignified deportment, which leaves the nurse her office, without neglecting any real service to the patient, whilst it inspires respect, is the true line of honouring both the profession and the individual.

At page 82 the author uses the term "strike" instead of penetrate; and afterwards he talks of "striking the artery" in an operation for aneurism, which is certainly a Scotticism, or license, not very intelligible.

The histories of sloughing, destruction of skin, and of deep, irregular abscesses, are accompanied with plates and details, which we cannot help thinking almost superfluous, had we not been encouraged by the following note, page 89: "It has been long remarked, that nothing is more instructive than stupidity, whether it betray itself, or be detected by others. I think the following case, which *I* have extracted from Mr. Ford's useful book on the Disease of the Hip-joint, is an admirable example of this; it is an instance of an *ignorant fellow* blundering upon the cure of a fistula in the breast, which would have done him honour, if either he had intended what he did, or had understood what he had done."

Again, on the treatment of ulcers by empirical methods, the author condescends to forget all the good manners he inculcates in his first Discourse, and divides the substances used in the experiments of Mr. Hume on ulcers into "devilish drugs" and "innocent drugs," and finally sweeps away the subject under the title of "all this *farrago* of empiricism." Page 97.

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The medical profession is quite aware of the ill-founded hypotheses which directed the practice of their ancestors in surgery; and in the department of treating ulcers, these idle opinions are most conspicuous. The students of this age may safely bestow some attention on those experiments which lead to a better knowledge of the modus operandi of topical applications, or, at least, of the degrees and kind of influence given to variously-conditioned sores, by the simple substances which are usually combined to form dressings. The trials made by Mr. Home, and which are so abused by our author, seem to us both philosophical in their design, and to have been commendably executed. Some judicious distinctions, apparently resulting from observation, accompany the History of Ulcers, "*Hospital Sore,*" &c.

The chapter on bandages is amplified with numerous engravings, by quotations from old authorities, and by copious invective against modern surgeons, &c.: some judicious arguments, however, occur in favour of these applications for several local diseases.

The treatment of hæmorrhage occupies a field of discussion, the greater part of which is very unprofitable to the reader; it comprehends incantations, miracles, lives and characters of men; and abundance of other extraneous subjects. The spontaneous cessation of arterial hæmorrhages is attributed to "the cellular substance which surrounds the artery being injected with blood," and "not to the retraction of an artery, nor the constriction of its fibres, nor the formation of clots."

In treating of aneurisms, the following specimen of reasoning will shew the mode in which this subject is handled: "The pathology of the aneurismal sac is nearly the same with that of a diseased bone. The blood is injected among the cellular substance; the parts are separated from each other; a foreign body (the blood) is driven in betwixt every fibre! the parts are moreover compressed by the general tension of the tumour, and all the parts are like the artery itself insulated, deprived of nourishment, ready to fall into gangrene. The aneurismal sac either falls into actual gangrene and bursts, or is at least on the borders of gangrene before it is opened. The pressure is reciprocal, and the surface does not thus give way before the parts within the sac are ready to fall into universal ulceration, and to slough off; and when the sac bursts, or is opened, the putrefaction of the blood augments the natural fœtor and foulness of the suppuration. This is the reason of

suppurations extending along the bed of the artery, for the blood is driven along in that sheath of cellular substance which surrounds it: this is the reason of the ulceration and erosion extending all along the insulated portion of the arterial canal; this is the reason of ligature after ligature giving way; and this is the reason why the artery is often more dangerously affected, more diseased and ulcerated, even in recent wounds, than in natural aneurism and spontaneous dilatation of the artery! Bursting of arteries, yielding of ligatures, sudden and fatal hæmorrhages, are as frequent in recent wounds as in old aneurisms!" Page 230.

At the conclusion of this Discourse some arguments are entertained concerning the best mode of securing the main trunk of an artery in the case of operation for aneurism; Mr. Bell prefers a smaller ligature than is usually employed, and he recommends the clearing away of all adjoining membrane, nerve, muscle, &c. so as to include only the vessel to be tied. We apprehend, however, that a more successful practice results from using large ligatures, from emptying the vascular system, and keeping it very low for several weeks after such operations. Thus are secondary hæmorrhages prevented, which no mechanical skill, or attention to the after-treatment, could otherwise avert.

In a general Discourse on the arterial System, the History of Inosculations, the frequent Interruptions in great Arteries, and "of *the retrograde Motions of the Blood!!*" the author exhibits considerable knowledge of anatomy; although we doubt whether his physiological conclusions are drawn with that strictness and masterly view which the subject demands. He speaks positively of the muscular coats of arteries, and considers inosculation "as a form and property of all arteries;" so that the course of circulation may be expected to continue through the thigh and leg, although the inguinal artery itself should be obliterated.

Thus far we have advanced in the ungrateful task of making known the general plan and execution of a huge professional work. We could have wished to meet with those rudiments of the art, and those systematical arrangements, which a professed system for the use of students ought to contain, and that the whole had proceeded with dignity and good temper.

(To be continued.)

Art.

ART. II. *A Treatise on febrile Diseases, including intermitting, remitting, and continued Fevers; eruptive Fevers; Inflammations; Hemorrhagies; and the Profluvia: in which an Attempt is made to present, at one View, whatever, in the present State of Medicine, it is requisite for the Physician to know respecting the Symptoms, Causes, and Cure of those Diseases. Vol. III.* By A. PHILIPS WILSON, M.D. F.R.S. Ed. Fellow of the Royal College of Physicians, Edinburgh, &c. Octavo. 538 pages. CADELL and DAVIES, London. 1801. Price 9*s*.

THE first two volumes of this interesting publication have been already noticed by us in our Review *. They contained the author's first division of Febrile Diseases, the *idiopathic* fevers, which included intermittent, continued, and eruptive fevers. The volume before us begins the consideration of *symptomatic* fevers, which the author divides into phlegmasiæ, hæmorrhagiæ, and profluvia; in all which the local affection is the primary complaint, and the fever so constantly proportioned to it, that we can almost always judge decisively of the degree of the local affection by observing that of the febrile symptoms.

Symptomatic fever he defines "a primary local affection, attended with increased temperature and a frequent pulse."

The first order, that of the *phlegmasiæ*, he describes as a disease "in which the local affection is either an external inflammation, or a fixed pain with derangement of some internal function."

Hæmorrhagies consist in "symptomatic fever, in which the local affection is a flow of blood not occasioned by external injury."

The definition of *profluvia* is that of "symptomatic fever, in which the local affection is an increase of some colourless excretion."

"The local affection of the phlegmasiæ sometimes appears without being accompanied with fever;" this the author terms "*inflammation*," in contradistinction to phlegmasia, and employs an introduction of considerable length to investigate its symptoms, remote and proximate causes, terminations and treatment. The proximate cause of inflammation seems to be a favourite subject of the author, and has received much attention from him. His ideas on the subject are well worthy

* Vid. London Medical Review, vol. ii. and v.

consideration; and, though known to many who have studied in Edinburgh of late years, yet, as they have not till now come before the public, we shall present our readers with them at some length. It may be proper to observe, for the information of such of them as are not particularly acquainted with the medical school of Edinburgh, that the question of the proximate cause of inflammation *is very much agitated* among the students of that university, and is a frequent subject of controversy in the Medical Society.

On the symptoms of inflammation, the author observes, that "simple inflammations are of two kinds, the one vulgarly termed a pimple, and the other which may be termed a stain, blotch, or efflorescence." To the former he gives the name of *pustule*, to the latter that of *erythema*.

"In the pustule there is an evident swelling rising in the shape of a cone, the apex of which is sooner or later formed into a small cavity, filled with yellow matter called pus." It may be defined "inflammatio, tumore circumscripto, in fastigium elevato, sæpe in apostema abeunte."

"In the erythema there is no swelling of this kind, although some general swelling of the part it occupies is always more or less observable. The surface is uniformly smooth, there is no sudden elevation of the cuticle, and pus is never formed." It may be defined "inflammatio rubore uniformi serpente, tumore partis sæpe vix evidente."

"Of both inflammations redness is a characteristic symptom; but in the former it extends only to the little cone, and a short way around its base; in the other it is more diffuse, frequently spreading over the face and hands in a perfectly uniform manner.

"They also agree in being frequently attended with some degree of pain, which in the pustule is more obtuse and pulsatory, in the erythema often stinging: in this respect however there is considerable variety. In both species the temperature of the part is increased.

"All inflammations agree in being attended with redness, increased temperature, pain, and swelling;" they vary according to their termination, by resolution, suppuration, or gangrene, and in other less important particulars.

On the remote causes of inflammation it is stated, that "all parts of the body, if we except a very few, the cuticle, nails, hardest parts of the teeth, and hair, are subject to it."

"Eruptions are frequently connected with the state of the

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primæ viæ;" and to a derangement of these passages we must frequently refer the production of simple inflammation, as is well known to those affected with pustules, or erythema of the face. "Among the predisposing causes may also be ranked too full a diet, particularly too free an use of fermented liquors. Too scanty and poor a diet also sometimes give the same predisposition. The same may be said of whatever debilitates, fatigue, excessive venery, &c. which act also sometimes as exciting causes. In short, we shall find that there are two very opposite states of the system favourable to inflammation; a state of debility, especially if attended with plethora, and a state of increased excitement.

"The causes which act locally may be arranged under three heads.

"1. Whatever increases the impetus of the blood towards the part.

"2. Mechanical irritation.

"3. Chemical irritation, under which are included extremes *and sudden changes* of temperature.

"The causes of the phlegmasiæ are the same with those of simple inflammation; for in these we shall find that the local affection excites fever, not because it is of a different nature from simple inflammation, but because it is more extensive, or situated in a part of greater importance and sensibility."

The author now proceeds to lay open his ideas of the proximate cause of inflammation. In considering the operation of emetics, cathartics, &c. it may be observed, "that such is the constitution of the animal body, that whatever injures it, excites motions calculated to correct or expel the offending cause. In such cases we can readily trace the motions excited, and the manner in which they act, but cannot trace the manner in which the offending cause excites these motions.

"Now if it can be shewn," continues he, "that inflammation, like vomiting, coughing, &c. is an effort of the system to remove an offending cause, and if we can trace every step of this operation, with the exception of the changes induced on the nervous system," (the nature of which he considers as placed beyond view,) "we understand the nature of inflammation as completely as that of any function of the body.

"Of the opinions which have generally prevailed on this subject, four only deserve attention.

"1. That which supposes a morbid lentor of the blood clogging the minute vessels.

"2. That

"2. That which supposes what has been termed error loci, the grosser parts of the blood getting into vessels too small to transmit them.

"3. That which supposes a spasm of the extreme vessels.

"And lastly, that which attributes inflammation to a morbidly increased action of the vessels of the part; and this is the favourite hypothesis of the present day, at least with the medical men of this country.

"The reader will readily perceive that the principle of the three first doctrines is the same. In all, obstruction is regarded as the proximate cause of inflammation."

The following experiment, however, the author relates as proving "that obstruction of the vessels may exist without producing a single symptom of inflammation."—"I passed," says he, "a hot wire through the web of a frog's foot, by which the skin about the hole was shrivelled, and the vessels obstructed, no fluid of any kind being discharged. Here an obstruction was produced surely more than equal to what takes place in many inflammations of small extent, and yet no symptom of inflammation followed; every part of the web appearing as pale as before the experiment."

The last opinion, that "of inflammation depending on a morbidly increased action of the vessels of a part," the author considers as having had its origin in the idea formerly entertained on the production of animal temperature, that it depended on "the friction of the blood against the sides of its vessels." The heat of an inflamed part was greater than natural, which could only be supposed to arise from increased velocity of the blood, occasioned by "increased action of the vessels of a part."

It was soon, however, found, that the circulation is as quick in many of the cold, as in some of the warm blooded animals, and consequently that the doctrine now mentioned is erroneous. "But admitting," continues the author, "that animal temperature depends on the motion of the blood, does the blood move with increased velocity in an inflamed part? Whether it does or not, the supporters of the hypothesis before us have not thought it worth while to inquire. What if the blood is found to move more slowly in an inflamed than in a sound part!

"It will hardly be believed, that the increased redness of the part has been adduced as an argument in favour of the same hypothesis; for admitting that the increased redness, which can only depend on an increased quantity of blood in the vessels,

vessels, (for all admit that in inflammation there is not necessarily any extravasation of red blood;) admitting, I say, that the increased redness depends on an increased action of the vessels, it would baffle the most acute to shew how it could possibly be; how a more vigorous contraction of the vessels can enable them to receive a greater quantity of blood.

"Every systole of the heart distends those arteries into which it immediately propels the blood; but the artery is furnished with an elastic coat which resists this pressure, and which, immediately after the impulse which distends it ceases, begins to resume its former dimensions, contracting the diameter of the artery, and thus pressing the blood on in that direction where the least obstacle is opposed to its passage, that is, forwards; the valvular structure of the arteries where they leave the heart preventing its return to this organ.

"But we are acquainted with no body so perfectly elastic as to return to its former dimensions with a force equal to that which compressed or distended it. If then there be no power inherent in the arteries by which the blood may be propelled, but a degree of elasticity, the impetus given by the heart must not only be sufficient to overcome friction and other causes impeding the circulation in every part of the body, but also to admit of considerable diminution from the loss it suffers in distending the blood-vessels.

"The vessels, then, are endowed with a power different from mere elasticity; and there are a sufficient number of observations to leave no room to doubt, that this power differs only in degree from that of the heart, that is, is a muscular power.

"When we speak of a morbidly increased action of vessels, do we allude to the state of their muscular coat? If the muscular fibres of the blood-vessels run transversely, what must be the effect of unusual contraction? An unusual diminution of their area. Do we mean by morbidly increased action, an increase of elasticity; the consequence of this can only be a greater tendency in the vessel to preserve its mean area.

"After each contraction of the muscular coat, the elastic acts as its antagonist till the vessel arrives at the mean degree of dilatation; but after this there is no farther power of distention inherent in the vessel. The action of the elastic coat ceases, and it is needless to observe, that a muscular fibre has no power to distend itself.

"The only power by which the vessel can be farther distended is the vis à tergo; after the vessel arrives at its mean degree of

of dilatation, both the elastic and muscular coats act as antagonists to the vis à tergo, to the force propelling the blood into, and thus tending farther to dilate, the vessel. If then the vis à tergo becomes greater than in health, the powers of resistance inherent in the vessels remaining the same, or if the latter be weakened, the vis à tergo remaining the same, the vessel must suffer a morbid degree of dilatation. There appear to be no other circumstances under which a vessel can suffer such dilatation.

"The opposite of this state is, when, the powers of the vessels remaining the same, the vis à tergo is diminished; or the vis à tergo remaining the same, the power of the vessels is increased; and this opposite condition produces an opposite state of the vessels, a preternatural diminution of their area.

"In the one case, the distending bears too great a proportion to the resisting force; and preternatural distention is the consequence. In the other, the resisting bears too great a proportion to the distending force; and preternatural contraction is the consequence."

The doctrine of inflammation, which is here brought forward, is stated to have been first proposed, in a consistent form, in the Royal Medical Society of Edinburgh, about the year 1790, by Dr. Lubboch of Norwich, and Mr. Allen of Edinburgh. It has never till now been laid before the public; but as it is well known in Edinburgh, it has occasionally been noticed in inaugural dissertations published at that university; one of them, that of Dr. Fowler of Salisbury, published in the year 1793, attempts to invalidate this doctrine by several arguments and experiments, which the author considers at full length in the present work.

In pursuing the subject, and in answering the objections of Dr. Fowler, the author says, "that it is not necessary in this theory that the vessels should be in a state of greater debility than in health, that their action may be more powerful; it is only maintained that the proportion which their action bears to the vis à tergo is less than in health. The vis à tergo remaining the same, the vessels, before inflammation can take place according to this doctrine, must be in a state of debility; but if the vis à tergo is increased, as in synocha, inflammation may take place although the vessels of the part act as powerfully as in health, or more so. But after the inflammation has taken place, as they are supposed to be preternaturally distended, we must suppose them debilitated.

"The degree of inflammation is not proportioned to the debility of the vessels of an inflamed part, but to the diminished proportion

proportion of their power to the vis à tergo, the greater the vis à tergo, ceteris paribus, the more considerable must be the phenomena of inflammation.

"In an inflamed part the capillary arteries are in a state of debility, the larger in that of increased excitement. The difference between what is called active and passive inflammation depends on the degree in which the larger arteries are excited; and we have reason to believe, that in the cure of inflammation by resolution, in proportion as the debilitated capillaries are excited to action, the action of the larger arteries abates, and the inflammation is cured as soon as the proper equilibrium is restored between the larger arteries and the capillaries, although the vessels of the part are upon the whole in a state of greater debility than previous to the attack of the disease.

"And that such is the case will appear probable, among a variety of more direct observations, from this consideration alone, that when the inflammation is of such importance and extent that the increased action of the larger vessels extends to the heart, so that the inflammation is attended with general increased action of the vascular system, that is, with synocha, we observe that, as the inflammation yields, the general excitement subsides, and that when the inflammation is removed, the whole system is left in a state of greater debility than before the disease.

"Inflammation therefore seems to consist in the debility of the capillaries followed by an increased action of the larger vessels, and is terminated as soon as the capillaries are so far excited, and the larger arteries so far weakened by their excessive action, that the force of the capillaries is in due proportion to the vis à tergo."

As the author conceived that the truth or falsity of the doctrine in question was capable of being determined by microscopic observations, he made several experiments on the subject, which he gives us in detail. "Having adapted," he says, "the web of a frog's foot to a microscope, I now and then observed the velocity of the circulation for some minutes, which during this time continued, as far as I could judge, the same. I then wetted the foot with distilled spirits, and in a few seconds observed the blood in all the vessels of the web moved with a wonderfully increased velocity, which, as I constantly kept the web moist with spirits, continued as long as I observed it, ten minutes or a quarter of an hour. But during no part of the time could I perceive the slightest symptom of inflammation, either with or without the microscope.

The vessels, instead of appearing redder and more turgid, were evidently paler and smaller than before the application of the spirits. I still farther increased the velocity of the circulation in the web by throwing on it the concentrated rays of the sun from the speculum of the microscope, and still with the same effect."

In order to determine the state of the circulation of an inflamed part, he applied the web of a frog's foot accidentally inflamed by some means or other to the microscope, and "found the vessels of the part greatly dilated, and the motion of the blood extremely languid. In several places, where the inflammation was greatest, it had ceased altogether. It was at once evident, on observing the part through the microscope, that where the inflammation was greatest the vessels were most dilated, and the motion of the blood was slowest.

"The distention of the vessels, which in the healthy state admit only the colourless parts of the blood, was apparent; for in the inflamed parts a much greater number of vessels admitted the red particles than in the sound, and the interstices of the red vessels appeared more opake, probably from the enlargement of innumerable small vessels, still too small to admit the grosser parts of the blood.

"While I was viewing," he continues, "the inflamed web, it occurred, that if I could succeed in stimulating its vessels to action, and thus remove the inflammation, which by this time I was thoroughly convinced depended on their debility, this would be an additional proof of the doctrine before us..

"With this view I wetted the inflamed web with distilled spirits, at the same time throwing upon it the concentrated rays of the sun from the speculum of the microscope. The blood, in all the vessels except in those of the most inflamed part, began to move with greater velocity; and in proportion as this took place, the diameters of the vessels were diminished, and the redness became evidently less remarkable, the web seemed paler, and the interstices of the vessels became less opake.

"In the most inflamed part, however, the blood was still stagnant. After I had despaired of restoring action to the vessels of this part, I saw the blood begin to move slowly in a vessel which ran directly through the middle of it. It soon acquired a considerable velocity, and on taking a superficial view of the part through the microscope, the course of this vessel appeared like a streak of a lighter colour through the middle of the red inflamed part."

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The same phenomena were observed on the fins and tail of a lampern. Friction would occasionally accelerate, or even renew the motion of the blood; and where a healthy part was roughly irritated, though it was for a little time pale, yet it soon became turgid from the vis à tergo forcing the blood into the vessels debilitated by the previous irritation.

In order to know the effects of inflammation on a warm-blooded animal, a rabbit was made the subject of experiment. "A small opening was made through the skin and muscles of the abdomen, through which, by the struggles of the animal, a portion of the intestines and mesentery were soon protruded." Part of the latter was brought within the field of the microscope, and gently irritated with a pair of forceps, while Mr. Boraston (a friend of the author's, accustomed to microscopic observations, and unacquainted with the object of these experiments) observed the effects, which are delineated in a plate. Mr. Boraston's own words are given. "The large arteries and veins were too opake to admit of my distinguishing the motion of the blood; but in the small vessels, which were more transparent, the circulation was easily observable; and I perceived the globules of the blood moving along with great rapidity, but not in sufficient quantity to give a red colour to the vessels.

"After a few minutes exposure to the air, the vessels became visibly enlarged, and in some parts assumed a reddish colour, while the velocity of the blood was proportionably diminished.

"As soon as a part of the mesentery, which lay within the field of observation, and appeared almost colourless, was irritated with the point of a small pair of forceps, a red spot appeared. In a few seconds it increased in size, the adjacent parts of the vessels were distended, and, the current of blood becoming less rapid, was for some distance slightly tinged with a red colour.

"This enlargement of the vessels gradually extended. The circulation was at this time extremely languid, and at length was not discoverable at all. When, in this last stage, the motion of the blood was entirely stopped, a reddish shade was seen to have diffused itself over those parts of the membrane contiguous to the inflamed vessels."

"It appears then," says the author, "from the foregoing experiments, that the state of the capillaries in an inflamed part is that of preternatural distention and debility. That of the larger vessels may be determined without the aid of the microscope. Unassisted by glasses we readily perceive that they

they do not suffer a similar distention, and their increased pulsation sufficiently evinces their increased action. Nor is this increase of action so obscure as to be observed with difficulty; I have often, in inflammatory affections of the jaw, applied the finger to the external maxillary artery, both where it passes over the bone, and after it assumes the name of labialis, and in rheumatic affections of the head to the temporal arteries, and perceived them beating with unusual force. I have frequently had occasion to mention an unusually strong action of the temporal arteries as a symptom of inflammation of the encephalon."

From this theory of the doctrine of inflammation the author feels no difficulty "in explaining the phenomena of inflammation, the modus operandi of its causes, and of the means which relieve it.

"The symptoms essential to inflammation are redness, swelling, pain, and increased temperature."

Redness, the author is of opinion, is a consequence "too evident to require any comment."

Swelling is occasioned principally by vessels which are turgid with red blood, and is not owing to an effusion into the cellular substance; for it should then be white, as in anasarca, not red as it really is.

The pain is regarded by the author as the consequence of the preternatural distention of the capillaries; "it is often pulsatory, corresponding with the pulsation of the larger arteries, which, being in a state of increased excitement, tend at every contraction farther to dilate the capillaries, the sensibility of which is increased by the unusual accumulation of arterious blood."

The *increased temperature*, according to the author, is no less deducible from the debility of the capillaries; and the production of it on his theory he considers perfectly congenial with the new doctrines of heat. "The motion of the blood, so far from being the cause of animal temperature, does not even seem to promote the evolution of caloric from the blood, which takes place as readily," (according to the observations and experiments of Dr. Crawford, Lavoisier, Girtanner, and Hassenfratz,) "the blood being arterial, when it stagnates in its vessels, as when propelled through them with its greatest velocity.

"It therefore follows, that, where there is an accumulation of arterial blood, there must also be an increase of temperature.

"Although the temperature of an inflamed part is increased,

creased, any portion of its blood must, however, evolve less caloric than the same quantity of blood in a healthy part."

This appears from the experiments of Dr. Crawford, Dr. Fordyce, and Mr. Hunter, who all found that "in proportion as the temperature is increased, the evolution of caloric from the blood is diminished; and, that when the temperature is raised but a very little higher than the natural degree, it ceases altogether.

"The waste of caloric in the whole inflamed part is greater than it was when the part was sound; but the waste of it in any particular portion of its blood is less. But it is only in proportion to the waste of this principle, that the blood assumes the venous colour; hence the florid appearance of an inflamed part."

The final cause of the increased *pulsation* of the larger vessels of an inflamed part seems, to the author, to be, that the increased vis à tergo may promote the circulation, and stimulate the debilitated vessels. "Thus," says he, "we find that wherever the vis à tergo is much diminished, the circulation in an inflamed part is apt to fail altogether, and gangrene to supervene."

The efficient cause seems to be involved in obscurity. The author refers it to the nervous system; "but to trace the changes which take place in it, and the manner in which these excite the larger arteries to inflammation," he regards "as impossible as to trace the changes produced in it by an emetic, and the manner in which they excite the action of the abdominal muscles and diaphragm."

On the operation of the *remote causes* of inflammation the author observes, that "if inflammation depend on the diminished proportion of the power of the capillaries to the vis à tergo, it will, it is evident, be most apt to supervene under the three following circumstances. 1. In a state of plethora, because then all the vessels are over-distended, and consequently any cause tending farther to distend any of them, whether it be a cause debilitating them, or increasing the vis à tergo, will be more felt than in health. 2. In a state of general debility, because then the vital powers in any part are more readily destroyed than in health. 3. In a state of general excitement, because then the vis à tergo is every where strong, and consequently apt to occasion distention of the vessels wherever any degree of debility occurs. These are the states of the system, which are found to predispose to inflammation. In the first and last the inflammation is generally of that kind which has been

been termed active, the vis à tergo is considerable, the larger arteries being readily excited to increased action. In the second of the above states what is termed passive inflammation is most common, the larger arteries, in proportion as the system is debilitated, being less readily excited."

The author reconciles the terminations of inflammation with his doctrine, by observing, that "when an inflammation is cured by resolution, that is, without the destruction of any of the parts it occupies, the vis à tergo has succeeded in exciting the capillaries to action. Resolution is often promoted by an effusion from the inflamed vessels, for when the vessels are so much debilitated by distention that the only effect of the vis à tergo is farther to distend them, there is no hope of exciting them to action without diminishing the volume of fluid which distends them. The fluid discharged in such cases is often serum or coagulable lymph. When inflammation terminates by suppuration, there is a destruction of a certain portion of the inflamed part, in consequence of which a cavity, termed an abscess, is formed, which from the first is filled with pus, the quantity of which increases in proportion as the cavity enlarges. Whether the termination by a secretion of pus, the texture of the parts remaining entire, deserves the name of suppuration or resolution, it is of little consequence to inquire."

The author here gives us some of the various opinions which have been entertained by authors on the nature, chemical analysis, and distinguent characteristics of pus; but as these are mentioned in the writings of Pringle, Gaber, Bergman, Hunter, Home, Darwin, &c. it is unnecessary to insert them. After some short observations on gangrene and scirrhus, as sequelæ of inflammation, he proceeds to the general indications of cure. "All the means which promote resolution," says he, "may be arranged under two heads.

"1. Those which lessen the volume of fluid distending the debilitated vessels, either by directly abstracting part of that fluid, which is done by evacuating part of it, or by occasioning a congestion in some neighbouring part; or by diminishing the vis à tergo which occasions the accumulation.

"2. By the application of stimuli to the inflamed part, by which the debilitated vessels are excited to action.

"How perfectly the operation of these means corresponds with the foregoing doctrine of inflammation, need not be farther pointed out. It has generally been considered very explicable indeed on the old hypothesis; but for the fallacy of that explanation it is only necessary to appeal to the foregoing experiments.

riments. It is true indeed, that, did inflammation depend on a morbidly increased action of the inflamed vessels, it would be relieved by abstracting part of the fluid which supports this action. But how shall we explain the effects of astringents and other stimuli applied to the inflamed part? These, we are told, exhaust the excitability of the inflamed vessels, and thus moderate their action. But it appears from the foregoing experiments, that the effect of these is that of increasing the action of the inflamed vessels, and that it is only in proportion as they have this effect that they relieve the inflammation."

Of simple inflammations, pimples and other habitual inflammations of the face are the only ones deserving much attention. To remove them, the author recommends solutions of sugar of lead, but still more, weak solutions of corrosive sublimate, which is supposed to be the base of Gowland's lotion. In some cases, however, the latter, though it removed the complaint, induced headach, which went off on discontinuing it.

The author concludes his extensive introduction to the third volume, by some observations on the local affection of the hæmorrhagia and profluvia. On these he thinks it unnecessary to be diffuse, as the same doctrine applies to them as to inflammation in general.

"Like inflammation, they are of two kinds, namely, that which is the consequence of local debility, and that which arises from an increased vis à tergo.

"The debility and consequent relaxation may be so great as to permit the red blood to escape, as frequently happens in typhus or scurvy. In general, however, the effusion of red blood is the consequence of rupture, either from external violence or increased vis à tergo; hence the frequency of hemorrhagy in synocha. And the vis à tergo being increased in consequence of local debility, as in the case of inflammation, the same cause, viz. the local debility, which renders the vessels subject to rupture, increases the force which distends them, till some vessel giving way the distention is relieved, the vessels recover their tone, and the inflammation ceases. Hence it is, that inflammation is often cured by a spontaneous hemorrhagy from the part; and hence it is that more or less inflammation always precedes what is called active hemorrhagy, that is, spontaneous hemorrhagy in which the vis à tergo is greater than in health.

"Passive hemorrhagy is only a greater degree of that state which we term passive inflammation, in which the local symptoms,

toms, as well as general excitement, are inconsiderable, the vis à tergo not being sufficient to distend the vessels to that degree which occasions the pain, temperature, and other symptoms of active inflammation.

"But if the relaxation is chiefly in the colourless vessels, and particularly in the exhalents, which frequently happens, because, the farther vessels are from the heart, they are the more easily debilitated, the discharge will be colourless, and this discharge increasing as the vis à tergo increases, prevents much inflammation by preventing congestion."

The author now enters upon the particular consideration of the phlegmasiæ, which we must, however, defer to a future Number.

Art. III. *The Institutions of the Practice of Medicine; delivered in a Course of Lectures.* By Jo. Baptist Burserius, de Kanifeld. Translated from the Latin by William Cullen Brown. In Five Volumes. Vol. II. Octavo. 519 pages. Cadell and Davies, London. 1801. Price 8*s*.

THE author of this work, as we formerly mentioned *, divides the class of fevers into four parts; the first comprising the intermittents; the three last the continued, which are subdivided into continentes, or those of an equable and almost uniform course; remittentes and compositæ, or those formed by the combination of continued fevers with intermittents, or of simple continued fevers with remittents. The first volume of the translation comprehended the two first parts; in that now before us the author proceeds to treat of the continuæ remittentes, the principal distinctions of which, he says, are derived from the manner and time of their exacerbation. These he describes under a great variety of appellations, each of which we shall notice in its turn.

Under the head of continued quotidians are comprised the "quotidiana continua veterum," the epiala of Galen, and the "febris syncopalis humorosa" of Avicenna. Each of these the author describes at some length; but as his description contains little important information, and as the greater part of all that he says respecting them is borrowed, almost verbatim, from Sennertus, (though without acknowledgment,) we do not think it necessary to detain our readers with even an

* Medical Review, vol. iv. p. 168.

abridgment

abridgment of it. The symptomatic continued quotidians, which he enumerates, may be referred with much greater propriety to hectic.

The FEBRIS CATARRHALIS is the next fever of this type described by our author. For ranking it with idiopathic fevers he deemed an apology requisite; but that which he offers, in its original state not very intelligible, is rendered still more obscure by the carelessness of the translator, and leaves us wholly at a loss as to the reasons of his so placing it. The description of the disease is concise and accurate. The author thinks that it is not always owing to the sudden checking of perspiration; but is sometimes produced by inspiring, or otherwise receiving into the system "an epidemic acrid;" by which term he means something imparted to the atmosphere by exhalation from moist, marshy, or otherwise insalubrious ground; or conveyed from a distance by winds. That this state of the air may give rise to catarrhal affections, appears from their attacking even those who have been for a considerable time confined to bed from other causes, and have used every precaution in shunning cold and the bad effects of exposure to the air. Sometimes also "the complaint is so rapidly diffused, that its propagation cannot depend merely on contact and communication with the infected, were the miasmata not spread in all directions by means of the winds."

With respect to the method of cure, we meet with nothing remarkable: the practice inculcated appears judicious, except that a greater number of medicines is enumerated than is consistent with the present general simplicity of prescription to employ.

After describing the fever which occurs on the second or third day after parturition, and is commonly called the MILK-FEVER, the author examines the opinions which have prevailed respecting its cause, particularly those of Hoffman, Van Swieten, and Sauvages. The first of these attributed the pain and fever to the tension occasioned by the afflux of the "redundant fluids" from the uterine vessels to those of the breasts; but this, the author observes, cannot be universally the cause, for the fever sometimes comes on before any turgescence of the breasts takes place. Besides, if it were so, the fever would probably only happen to those who bear children for the first time, as in them only would the dilatation of the vessels be attended with so much pain as to produce it. Sauvages considered the fever as an operation of nature, by which the blood being made to circulate with greater force

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and violence, the mamillary vessels are dilated, and a free passage opened to the chyle which is to be changed into milk. The author treats this theory as altogether unfounded; indeed much ingenuity is not required to demonstrate its absurdity. Van Swieten was of opinion, that a slight inflammation of the internal surface of the uterus is sometimes excited for the purpose of separating, by suppuration, the remains of the chorion, which adhere to it when the placenta has not been removed without some degree of laceration; and to this cause, as well as to the afflux of milk to the breasts, he ascribes the disease in question. The greatest difficulty, the author says, with respect to this opinion, "seems to be, that sometimes, though no faulty state of the uterus, no sense of uneasiness in the breast, precede or accompany it, nevertheless puerperal women are seized with the milk-fever."

His own opinion therefore is, that this fever is not to be wholly referred to any one cause, but that it chiefly depends on the contraction of the uterus; for when this takes place, and the lochia, in consequence, become thinner or less abundant, "the circulation is so changed, that on this account alone the motion of the heart and arteries is accelerated, and there arises a fever, of short continuance however, and ceasing on the equable circulation of all the humours being restored."

But if any impure fluid pass back into the blood, the fever will be protracted until every impurity has been expelled by sweat, urine, or stool, as usually takes place in three, four, or five days. The disease is generally so mild as to require little aid from medicine; if it be otherwise, the author recommends bleeding *from the foot*, abstinence, quiet, nitre, and the application of wet or dry fomentations to the breasts. He cautions against the indiscriminate use of purging, but advises frequent small doses of the arcanum duplicatum, (kali vitriolatum of our Pharmacopœia,) for those who do not choose to suckle their children, which, he says, "is generally the case at present." To prevent this disease, he directs that the infant shall be allowed to suck at the end of about twelve hours. If the fever be owing to an inflammation of the uterus, bloodletting is of course to be employed; the author seems to consider it of great importance whether the blood be drawn from the arm or the foot; but decides in favour of the former method, when the bad effects of a sudden and complete suppression of the lochia are to be obviated; and prefers the foot, for the purpose of recalling the due flow of them when they are only diminished. If repeated general bleedings fail to restore the lochial discharge, or relieve the congestion of

 blood

blood about the uterus, leeches are to be applied to the inner labia of the vulva, and very mild and emollient injections frequently thrown warm into the uterus.

Under the title of

ACUTE GASTRIC FEVER,

The author treats of a fever which derives its origin "from indigestion, or from vitiated, corrupted, and putrid matters and fluids, injuring the primæ viæ, and gradually passing into the blood, and which may be relieved and removed by stools," whether spontaneous or excited by art. This is the febris putrida of Tissot and some of the French writers; but as that term is now more usually applied to the contagious or "true petechial" kind, the author judiciously prefers that which we have given above.

The gastric fever generally observes the type of a continued quotidian. "It is preceded by those causes which injure, derange, or vitiate the digestion; which check the perspiration, and direct it to the intestines, which render the bile more copious or acrid, diminish the strength of the fibres, retard the motion of the humours at the lower part of the abdomen, suppress the secretions and excretions of the abdominal viscera, afford crudities and impurities to the stomach and intestines, as wet seasons, excessive rains, inundations, frequent vicissitudes of heat and cold, want of fresh vegetables, wine, vinegar, and corn, stale or worm-eaten bread, the abuse of unripe fruits, or such as are apt to run into putrefaction, or flesh, or milky or crude aliments, an idle life, or excessive care, watching, and study, grief, the action of long-continued passions, and, above all, a very sultry summer, and a succeeding moist rainy spring, and the like. To these some add the atmosphere's abounding with putrid effluvia, and marsh miasmata; although from these usually arise, not only gastric fevers, but also nervous *ones*, and other malignant, epidemic, and contagious *ones* of whatever kind, nay, even exanthematous diseases."

The marks which indicate the attack of this disease, are the same as those which announce the approach of most febrile affections; and the usual symptoms of pyrexia also characterize its commencement. After continuing during a night, these suffer some abatement; but in the course of the succeeding day irregular accessions or aggravations take place. The teeth, tongue, and fauces, are covered with a viscid and tenacious pellicle, sometimes whitish, sometimes brown and blackish, sometimes yellow and dirty-coloured. In some, costiveness occurs; more frequently, however, a diarrhœa, with tenesmus.

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The stools and breath are remarkably fetid. A moisture of the skin sometimes occurs, but affords no relief to the symptoms. The hypochondria "are for the most part raised, swelled, tense, and painful;" and in some places the epigastrium is so tender, that the patient cannot bear the slightest touch. Every stool is attended with much general uneasiness. Patients frequently start suddenly from sleep, or, when awake, are remarkably under the influence of fear; the latter of which symptoms is mentioned as particularly indicating depraved chylification.

But when the disease has been neglected or unsuccessfully treated, it assumes a still more formidable aspect; the accessions become more frequent and irregular; the anxiety and pain are increased; burning heat is felt internally, while the external parts are cool; hiccough, tremor, and subsultus tendinum, come on; the mind is affected; the abdomen and hypochondria become tympanitic; and the face is distorted by convulsive motions. Petechiæ appear on the skin, particularly about the neck, back, and breast, or sometimes an eruption of red or white spots, resembling millet-seeds, occurs either alone or intermixed with the petechiæ. With these symptoms the brain becomes more and more affected, "a cold sweat breaks out all over the body; the breast is oppressed; snoring succeeds; and, lastly, death closes the series."

When the disease is of a more benignant nature, after remaining for some time stationary, the violence of the symptoms suffers an abatement; the paroxysms have longer and more evident remissions; stools are passed with more ease, and afford more certain relief; and the strength and appetite are gradually restored. The duration of it, however, varies considerably; sometimes it terminates in a few days; sometimes it is protracted to six weeks. When it is fatal, it generally cuts off the patient on the ninth, eighteenth, or twentieth day.

In the treatment of this disease, the first object is to promote the expulsion of the noxious matter from the bowels, unless in plethoric habits, or when local inflammation prevails. In these cases, the author says, "blood ought to be drawn without delay: and if one bleeding proves insufficient, it may be repeated a second time. Among the symptoms indicating this remedy should be enumerated swelling, pain, and tension of the belly, together with costiveness. Otherwise, however, bleeding is not only superfluous, but hurtful."

Whether the primæ viæ are to be evacuated by vomiting or by purging, must be determined by the symptoms. The former

former is of course to be employed if the stomach be particularly loaded, as will appear "from the foulness of the tongue, bitterness of the mouth, fetid breath, nausea, vomiting of bile or phlegm, a sense of uneasiness or weight about the precordia, anxiety, sympathetic headach, tinnitus aurium, dimness of sight or vertigo; nor does the violence of the fever, or the suspicion of inflammation of the stomach and intestines, and the spitting of blood, *or any other symptom*, prevent our having recourse to this remedy." This is, perhaps, rather too universal a rule; yet it is certainly more reasonable than the precepts of some, who advise the beginning with an emetic in every case of continued fever, without reference either to its cause or its symptoms.

When "heaviness of the knees, pain in the loins, swelling of the epigastrium, or belly, without inflammation, borborygmi, flatulency, gripes, fetid, watery, corroding, and bilious stools," indicate the noxious matter to be situated in the intestines, purging must be had recourse to, either procured by small doses of neutral salts given frequently, or excited more copiously by brisker cathartics. In cases where great irritability prevails, oily purgatives are mentioned as remarkably serviceable. Acids, both vegetable and mineral, are recommended; and camphor, unless "the nervous sensibility be languid," in which case the arnica montana is said to have great efficacy as a stimulus. As cordials, wine and chocolate are particularized; and *sometimes*, the author says, preparations of opium may be given, as they "diminish the nervous sensibility, bring on rest, allay spasms, check immoderate evacuations, while they undoubtedly excite the irritability of the heart, like cordials, when given in proper time." If, notwithstanding these remedies, the fever is prolonged, and the headach continues, blisters are to be applied to the calves of the legs, or rubefacients to the soles of the feet; and if the affection of the brain still do not yield, "blood may be drawn from the parts nearest the head." This may, perhaps, be an expedient somewhat hazardous in an advanced stage of the disease, but is well deserving of consideration in some cases which, under the usual mode of practice, are with reason accounted desperate. When worms accompany this fever, they may sometimes be destroyed by the mineral acids; but lest these should fail, the author enumerates various other anthelmintics, observing that mercury is by no means to be reckoned among the number.

If the tympanitic affection, which frequently occurs, be inflammatory,

inflammatory, it is to be removed by emollient fomentations and injections, and by general or local bloodletting; if it proceed from relaxation and atony of the intestines, stimulating fomentations, consisting of aromatic plants boiled in wine, are to be applied; and internally are to be given spiritus nitri dulcis, extract of bark, camomile, arnica, and ageratum.

When the bowels are cleared, and the fever begins to abate, the remainder of the disease must be trusted to the bark; to which may, if necessary, be added rhubarb, or some cathartic salt. The diet must be light, avoiding animal food and soups of all kinds. During the whole disease, cold water ought to be employed for common drink, acidulated and sweetened according to the patient's taste; and the utmost attention is enjoined to cleanliness, and frequent renewing of the air of the patient's chamber.

The author next mentions the febris Hungarica, or camp fever, which, both from its nature and type, he considers as a variety to the acute gastric fever. It differs chiefly from that now described in the greater violence of the symptoms. To this the author seems disposed to refer the "yellow fever of America;" but having never seen this disease, he does not enter upon the consideration of it with his usual diffuseness. The "febris catarrhalis maligna of the Germans" he considers as being also a gastric fever, and to be treated as such, caution being however required as to bleeding. "But in each kind, the simplest and mildest method of cure is necessary, and preferable to more decided practice; for we learn by experience, that, in such fevers, physicians have often effected more by delay than activity."

We have been thus minute in presenting to our readers the author's view of the nature and treatment of what he terms the acute gastric fever, because we consider his observations respecting it to be peculiarly judicious, and because we think it to be a form of continued fever, much more frequently occurring in this country than practitioners in general are aware of. Many evils, we fear, result from the widely-prevalent error (originating probably in the Edinburgh school) of considering all continued fevers as of the same nature, and ascribing them all, without discrimination, either to contagion, or to an *incognitum quid*, the nature of which we cannot hope to ascertain, and therefore need not attempt to investigate. We readily indeed admit, that the study of medicine is very much facilitated by abolishing the many useless and frivolous distinctions which some systematic writers, and among

among them the author of the present work, have endeavoured to establish; we only contend that *all* these distinctions are not frivolous or useless; and we confidently recommend that now suggested to the attention of our practical readers.

Respecting the continued tertians, a variety of which is the Causus or ardent fever, we observe nothing new or worthy of particular notice.

Of the "remitting fevers, which observe sometimes the quotidian, sometimes the tertian type," the first which the author mentions is "the slow malignant remittent, called nervous fever;" a disease, he says, essentially different from the continent fever of the same name. It would, indeed, be with greater propriety named "hydrocephalic fever," as it is characterized by the symptoms of hydrocephalus, and, "after death, the organization of the brain is found relaxed, or hydrocephalus internus, dropsy of the medulla spinalis, or suppurations and abscesses of the encephalon, are discovered." The treatment, we are told, should be similar to that of the nervous continent fever, avoiding copious bleeding and purging; and employing cordials and all the remedies which excite the nervous influence, and increase the vital powers. If, as sometimes happens, some inflammation of the brain be conjoined, we must "have immediate recourse to bleeding, especially by means of cupping-glasses, and all kinds of revulsion."

The "febris remittens soporosa senum," the author says, is but little known, and unnoticed by most writers. It attacks only old people, and comes on with drowsiness and stupor, which, in some degree, go off on the first remission of the fever, and recur on its exacerbation. It is generally fatal, terminating sometimes on the seventh, eighth, or ninth day, more frequently on the eleventh or thirteenth. It is not contagious, or even epidemic. It is sometimes very slow in its progress, as appears from "the case of a certain great personage, who, after struggling through the severest and most fatal accessions of the fever, fell into a slow fever, attended with daily exacerbations, and at length, being completely exhausted, and continually in a state of delirium, expired on the hundredth day from the commencement of the attack!"

The "febris hemiplegiaca" appears to differ very little from that just mentioned, except in being accompanied by a degree of paralysis. We cannot help thinking that the state of the brain, which gives rise to this affection, ought to be considered as the primary disease; and that in this case, as well as in

in the two preceding, the fever is in great measure accidental, and wholly symptomatic.

In our next Number we shall proceed with the remainder of this volume.

Art. IV. *An Introduction to the Study of the animal Economy.* Translated from the French of Cuvier, by John Allen, Fellow of the Royal College of Surgeons, and Lecturer on the animal Economy, at Edinburgh. Octavo. 79 pages. Longman and Rees, London. Price 2*s.* 1801.

THIS translation was made from the Introduction to a work on Comparative Anatomy, entitled, "Leçons d'Anatomie comparée," published some time ago at Paris by M. Cuvier, and was undertaken principally for the use of the students attending a course of lectures on physiology, delivered by the translator in Edinburgh.

We had occasion to give our readers a general account of M. Cuvier's work in the Reviews of February and March last *; but as the Introduction to it, which is here translated, affords a very comprehensive and philosophical view of the relations which subsist between the different functions of the animal economy, we shall consider ourselves as doing them an acceptable service, by presenting them with a full analysis of that excellent production.

The first chapter contains *a general View of the Functions exercised by Animals.*

"The idea of *life*," the author observes, "is one of those vague and obscure ideas suggested to us by the observation of phenomena that succeed in regular and corresponding trains." Though we are unable to discover the nature of the relation between those phenomena, yet we are satisfied that such a relation exists, which is a sufficient reason for us "to class them together, and distinguish them by an appropriate term, which the vulgar mistake for the name of a particular agent or principle; whereas it is merely a general expression for the phenomena that suggested the formation of the term."

When we observe in our own bodies a power of resisting, or acting contrary to the laws of unorganized matter, we employ the terms *life, vitality,* or *vital power,* to express this apparent exception from the usual course of nature. It is

* London Medical Review, vol. v. p. 349, and vol. vi. p. 43.

therefore

therefore necessary to determine in what those exceptions consist, and to consider the bodies which present them, in their active and passive relations to the rest of nature.

"Take for an example," continues the author, "the female form, in the fulness of youth and health; observe that rounded and voluptuous swell of the limbs; that graceful ease in motion; that balmy warmth; those cheeks tinged with the roses of health; those eyes beaming with love, or sparkling with intelligence; that countenance enlivened by wit, or animated by feeling; every thing combined to form an object of fascination. A single instant suffices to dispel the charm: often, without an apparent cause, sensation and motion cease at once; the body loses its warmth; the muscles become flaccid, and disclose the prominent angles of the bones; the eyes lose their lustre; the lips and cheeks become livid. These are but the preludes to changes more hideous. The colour passes successively to a blue, a green, a black; the flesh absorbs moisture; and while one part of it escapes in pestilential exhalations, the remaining part falls down into a putrid, liquid mass. In a short time no part of the body remains, but a few earthy and saline principles; its other elements being dispersed through air, or carried off by water, to form new combinations."

As the body, when alive, was surrounded by the same agents which produced those changes after death, the elements composing it must have been kept together "by a superior force, which ceased to act at the instant of death;" and this principle of preservation seems to be essential to the idea of life.

"But farther attention to the economy of living bodies soon discovers to us, that the power which keeps together their elementary parts, in opposition to the external forces that tend to decompose them, is not confined to this negative operation, but extends its activity beyond the boundaries of the living body. There is, at least, no reason for supposing any difference between this preserving power, and that which attracts particles extrinsic to the living body, and interposes them between its integrant parts; nor is the action by which foreign particles are introduced into the living body less uninterrupted, than that by which its own particles are apparently kept together. For, not only is the absorption of alimentary matter, and its subsequent passage into the nutritive fluid, and its conveyance by the nutritive fluid to the different parts of the body, carried on with hardly any interruption, from one

 meal

meal to another; but there is a continual absorption from the surface of the body, and a third kind of absorption equally constant, depending on respiration. These two last are, indeed, the only kinds of absorption, in living beings which are without organs of digestion; that is, in plants."

As something, however, is continually thrown off from the body by perspiration and other means, there is not "an uninterrupted union," but "a continual circulation" in its parts; and the proportion between the quantity received, and discharged, is liable to variations from age and health. "The gradual induration of the living fibres, and obstruction of the living vessels, would render death the necessary consequence of life, though it were not accelerated by a multitude of accidental causes."

In an unorganized body the mode of existence depends upon itself; but parts separated from the living body die speedily, because they cease to participate "in the general motion which is produced by their union into an organized whole."

It is natural to inquire into the origin of this essential attribute of life. Every investigation of this kind "leads to this general conclusion, that there is no living body which was not at one time part of another living body, from which it has been since detached; that every living body has participated in the life of another living body before it was capable of carrying on living motion by itself; and that, from the living power of the body to which it originally belonged, it derived that degree of developement which rendered it susceptible of independent life. The vital motions of living bodies have, therefore, their real origin in the parent stock. It is from the parent that the offspring receive the vital impulse; life springs from life only; nor is there an example of living power which has not been transmitted from one living body to another in uninterrupted succession. However small the parts of an embryo, or of a seed, when first visible to us, they are already in full possession of life, and contain already the germ of all the phenomena, which, through the means of life, are to be afterwards developed.

"We have no other means, therefore, of ascertaining the real nature of the living powers, but by examining the structure and composition of living bodies;" our knowledge of their structure and composition is, however, too imperfect to enable us, from them, to explain their functions. We have a general acquaintance with the texture, figure, consistence, and position; of the distribution of the more considerable ramifications

ramifications of vessels; and of the general chemical characters and composition of both solids and fluids; "but the more delicate branches of the vessels, the intimate texture of the solids," and the ultimate analysis of both solids and fluids, have hitherto eluded our observation, as well as the nature of some subtile matters which are indicated only by certain phenomena. Though it be true, that this structure and composition "are in some measure the effects of the living powers which formed and which support them, still it is equally clear that the living powers can have no other source, or foundation, but in the body in which they inhere. If the chemical and mechanical elements of the body were originally combined by the living power of its parent, there must be the same living power in the body itself, since it exercises a similar action in favour of its descendants."

At the same time, though philosophers have not been successful in their endeavours to connect the phenomena of life with the general laws of matter, the author is of opinion, that "it would be rash to infer that they are regulated by laws essentially different; and, on the other hand, it would be fruitless to renew the attempt, while our knowledge of living bodies remains so limited."

Our knowledge of the composition of living bodies is, however, sufficient to enable us to recognise them long after death; "for no unorganized body presents us with that fibrous or cellular texture, nor with that multitude of volatile elements which continue to be the characteristic marks of organized bodies after their vital powers have ceased." And we may sum up the characteristics of all organized beings, by attributing to them "an origin by *generation*, an increase by *nutrition*, and a termination by *death*."

"Many organized bodies exercise no functions, but those subservient to the general functions of nutrition and generation; and possess no organs, but those required for the exercise of these functions. But in a great number of organized bodies there are functions carried on of a subordinate nature, which not only demand appropriate organs, but which influence the economy of the general functions, and modify the structure of the organs by which they are exercised.

"Of these subordinate functions, which imply organization, but are not the necessary consequence of its existence, the faculties of sensation and of voluntary motion are the most important, and have the greatest influence upon the economy of the other functions.

 "We

" We are conscious that these faculties belong to ourselves; and, judging from analogy and from external appearances, we attribute them to a great number of other beings, whom, on that account, we call *animated* beings, or, in a single word, *animals*."

The connexion between these two faculties seems to be necessary, " for it is impossible to conceive volition without desire, or without the sensation of pleasure or pain;" and " the benevolence of Nature forbids us to believe it possible, that she could have constructed sentient beings, susceptible of pleasure and of pain, without imparting to them the smallest power of pursuing the one, or of flying from the other."

Plants draw nutrition from the soil to which they are attached; but a locomotive animal must have the means of conveying with itself " the provision of juices necessary for its support." A stomach, therefore, becomes necessary for the reception of food, instruments for its previous preparation, and a system of organs to complete its *digestion*, or convert it into nutriment.

But *digestion* is not the only consequence of the locomotive faculty; vegetables are nourished by the ascent of the nutritious fluid by means of capillary attraction; but animals require " an active principle" to communicate motions to the fluids which nourish them. Hence, in the greater number of animals there are a heart and great vessels, for distributing and returning the fluid to and from different parts of the body. The circulation, however, " is less inseparably connected with sensation and voluntary motion than digestion is; for two numerous classes of animals (insects and zoophytes) are entirely destitute of circulation, and nourished, in a manner somewhat like vegetables, by the transudation of the fluid which is prepared in their alimentary canal."

" It is in the passage of the blood through the extreme branches of the arteries, that it contributes directly to the nourishment of the solids, and where, at the same time, it changes its nature and its colour; nor is it till after the addition of the substances which have just been mentioned, that the blood recovers its power of nourishing the solids, and is reconverted into arterial blood." The absorbents act the part of conveying to the venous blood substances from the skin and alimentary canal, and the lungs, whose functions depend upon the circulation, subject the venous blood to a " species of combustion," which in vegetables and animals without circulation is carried on by the whole external surface.

With

With regard to the mode of generation, animals are distinguished from vegetables by "their capacity for the enjoyment of love," and in them "the spermatic fluid can be directly applied to the germs;" whereas in vegetables it is necessary to enclose the pollen in small capsules, within which it may be transported safely by the winds.

From this general view of the functions of the animal economy, the author considers them as reducible to the *animal functions*, comprising sensation and voluntary motion, which enable animals to perform, and determine them to the performance of certain actions; the *vital functions* destined to the nourishment of the body, including digestion, absorption, circulation, respiration, perspiration, and excretion; and the function of generation intended to supply new individuals.

The second chapter *gives a general idea of the organs which compose the body of an animal.*

"The mechanical division of the body, when carried to its greatest extent, conducts us to small laminæ or filaments," constituting by their union cellular texture, which forms, by condensation, membranes, and these cylindrical tubes or vessels. "All the soft parts of the body, except the fibres, are an assemblage of vessels, differing in the fluids which they convey, in their number, in their course, and in the thickness of their coats."

Animal substances, by chemical analysis, are found to be composed of some earths, salts, phosphorus, carbon, azote, hydrogen, sulphur, and iron, which "constitute, by their various combinations, the different animal compounds, such as gelatin, albumin, fibrin, &c.; and these again uniting among themselves, form the different animal solids and fluids which we find in nature."

"The general organ of sensation is the nervous system, formed every where of the same medullary matter." It is divided into threads and filaments, by means of the distribution of which into every part of the body we are capable of sensation. Particular organs of sense are placed at the extremity of those nerves.

The general organ of motion is the muscular fibre, which is obedient to the will, through the medium of the nerves every where accompanying it. Even the irritability of muscles after separation from the body, seems to the author contrary to the opinion of Haller, most probably owing to the nervous matter contained in them. Animals which creep have their muscles inserted into different points of the skin; those which walk or

leap have them attached to hard parts, which serve as levers, and have the names of bones, shells, crusts, or scales. "The strength of muscles, the distance of their insertion from the centre of motion, the length of the lever to which they are attached, and the weight connected with it, determine the duration and velocity of the motions which they produce."

There is but one sense, that of touch, which belongs to every class of animals, and is exercised over every part of the surface of the body. The other senses are all seated in the head, and appear to be only more refined modifications of touch.

"The faculties of sensation and of muscular motion, which, in the greater number of animals, are exclusively confined to the nervous and muscular fibres, seem to be universally diffused through the whole substance of some gelatinous animals, in whom neither nerve nor muscular fibre can be discovered.

"It is by means of these two faculties that animals feel, desire, and are enabled to satisfy their wants. The most irresistible of these is hunger, which reminds them of the necessity of providing nutriment for their subsistence." The function of nutrition begins in the mouth, where the food is moistened and broken down. In the stomach it is acted upon chemically and mechanically, and brought to a pulpy homogeneous mass, which is afterwards mixed with secretions from the liver and pancreas, and the nutritious part carried off by the lacteals. The contact of air is, however, necessary to complete the preparation of nutritious matter, and to this it is exposed in the lungs, gills, bronchiæ, and trachěæ, of animals. In these the blood undergoes a species of combustion, losing a part of its carbon, and depriving the air of a portion of its oxygen; and this change in red-blooded animals enlivens the colour. The formation of the voice is a subordinate use of respiration.

These are the organs which the author describes as being possessed by the higher classes of animals: as we descend in the scale of being, some of them disappear; and in the more imperfect animals, we find nothing left but "a sentient self-moving sack capable of digesting food. All the changes within animal bodies are effected by the combinations and decompositions of the fluids which they contain," and the "true secret of the animal economy lies hid in the manner in which these changes are effected, as health depends on their regularity and order."

In

In general we find the seminal liquor to be "a secretion employed to excite the developement of the germs," which are afterwards nourished in the same way as other parts of the body.

Mr. Cuvier, in the next chapter, takes a view of *the principal differences among animals in their system of organs*; and the investigation of those differences he considers the proper province of comparative anatomy.

He describes three leading varieties in the situation of the organs subservient to motion. The bones are either internal with a vertebral column, and covered with muscles, as in the mammalia, birds, reptiles, and fishes; or the muscles are internal, and covered with scales or shells, as in insects and the testacea; or there are no hard parts at all, as in the soft worm. On this general outline depend the different kinds of motion which animals are able to perform.

The differences in the internal parts of the nervous system present us also with three well-marked divisions: the first is that of animals without vessels or nerves, as the polypi and zoophytes: the second, animals whose brain is above the alimentary canal, and the medullary cord beneath it, and in the same cavity with the viscera, as in the molluscæ, crustacea, insects, &c.: and the third, that of animals with vertebræ.

The senses may differ in number, situation, extent, acuteness, &c. according to the peculiar destination of the animal. In the stomach and chylopoietic viscera there are many important differences accommodated to the nature of the food, and the manner in which nourishment is to be appropriated, whether by absorption, as in most animals, or by transudation, as in the zoophytes. In some animals there is no circulation, and in others it is single or double; the number and position of the hearts also constitute important differences. The organs of respiration vary no less materially. In some animals there are lungs for this purpose; in some, as fishes, bronchiæ or gills; and in others, as insects, tracheæ. Some of the zoophytes, on the contrary, have no visible organs of respiration.

With regard to generation, it takes place in certain classes by growth from the parent, as in the zoophytes, and in others by copulation; in the latter the organs are either in separate individuals, or in the same, as among the molluscæ and zoophytes. Animals, too, may be either *gemmiparous*, *viviparous*, or *oviparous*; and while some at birth have nearly the

same

same form which they afterwards retain, others, as frogs and salamanders, are subject to metamorphoses.

The fourth chapter presents us *a view of the relations which subsist between variations in the different systems of organs.*

"There is not a single function," the author observes, "which does not require the assistance and co-operation of all the other functions, and which is not affected by the degree of energy with which the other functions are exercised." Respiration depends upon circulation, circulation upon the muscular action of the heart and arteries, while this faculty would remain inert without the influence of the nervous system. "How limited would have been the faculty of sensation, if it had not been aided by the muscular power? Of what use would have been the sense of touch, if the hand could not have been employed for the examination of external bodies? How confined would have been the perceptions of vision, if we had possessed no power of turning the head, or of moving the eyes?"

The mode of respiration in animals varies with the manner in which the nutritious fluid is dispersed, and the quantity of air consumed with the peculiar occasions for muscular exertion, which differs widely in the different classes of animals. The structure of the organs employed in the circulation of the blood depends much on the mode and nature of respiration, as does also digestion, which is found to be more powerful, as that respiration is more active.

The strength and capacity of the various organs of sense are much connected with the peculiar habits and mode of life of the animal to which they are appropriated. "Thus animals who can digest nothing but flesh, must, under the penalty of inevitable destruction, be able to discern their prey at a distance, to pursue it, to catch it, to get the better of it, to tear it in pieces. They must, therefore, possess a piercing eye, an acute sense of smell, swiftness in pursuit, address and force in the organs for catching their prey. Accordingly, a canine tooth, adapted to tear flesh, was never found, in the same animal, along with a hoof, fit for supporting the weight of the body, but totally unqualified for laying hold of prey. Hence, the rule that every hoofed animal is herbivorous, and as corollaries from this general principle, the maxims that a hoofed foot indicates grinding teeth with flat surfaces, a long alimentary canal, a large stomach, and often more stomachs than one, with many similar consequences."

Some

Some parts of the body, as those which prepare and digest the aliment, are in exact adaptation; and others are so strictly related in form, that a skilful naturalist would be able to judge from the appearance and structure of one part of the body concerning the nature of many others. It may be readily seen, that, from the study of the various relations which subsist between organs, physiology may receive much improvement.

The modifications which take place in the structure of various organs, as long as they are within the limits of the condition necessary for existence, are widely diversified; and when we recede from the principal organs, the varieties of structure become extremely numerous. By placing the organs together which have the greatest resemblance, we may construct a series or scale that shall appear to recede gradually from a primitive model, and "when we consider organs separately through the same class of animals only, we find them proceed, in their degradation, in the most uniform and regular manner, and often perceive a part, or vestige of a part, in animals where it is of no use, and where it seems to have been left by Nature, only that she might not transgress her general law of continuity."

The last chapter is *on the classification of animals from their internal organization.*

"Animals," says the author, "may be divided into the two great families of animals with vertebræ and red blood, and of animals without vertebræ, and most of them with white blood." Those with vertebræ are divided into the warm-blooded and cold-blooded: the warm-blooded, into the mammalia and birds; the cold-blooded into reptiles and fishes. Those without vertebræ have legs in common, and form a less regular series than the vertebrated. They may be divided into the molluscæ; crustacea; insects; an intermediate class, as earthworms and leeches; and zoophytes.

We have thus presented our readers, as much as possible in the language of the author, with a full analysis of this interesting publication, which has afforded us much satisfaction. The enlarged and philosophical view which the author has given of the objects of comparative anatomy, while it fully shews the important connexion between this branch of science and physiology, forms the best recommendation which he could possibly give to the work to which it is a prelude. The translation itself has been executed with care and ability.

 ART.

Art. V. *An Inquiry into the Structure and animal Economy of the Horse; comprehending the Diseases to which his Limbs and Feet are subject; with proper Directions for Shoeing, and pointing out a Method for ascertaining his Age until his twelfth Year. To which is added, an Attempt to explain the Laws of his progressive Motion, on mechanical and anatomical Principles. The Whole illustrated by* 18 *Copper-plates.* By Richard Lawrence, Veterinary Surgeon, Birmingham. 212 pages. Wallis, London. 1801. Price 1*l.* 11*s.* 6*d.*

These "first fruits of the author's literary labours," dedicated to Lord Heathfield, one of the great patrons of the Veterinary College, we have carefully perused throughout every page. The work is written in a neat professional style, and, as a composition, is very respectable; the plates also are well executed, the drawings being by the hand of the author himself, who, as well as a surgeon, is a horse-painter. However, a work of a different nature to the present would probably have been more conducive to the reputation of the author, and the instruction of the public; and we should be happy, on some future occasion, to peruse a register of *the actual practice* of this gentleman, who is doubtless very competent as an anatomist, rather than a mere repetition, however well written, of topics which have been already so often and so ably discussed. There lies, besides, another formidable objection to this work; the author has not only travelled too much out of the record, but into subjects on which he proves himself totally unpractised, and on which he copies with very little judgment: we allude to his introducing jockeyship, the principles of progression, crude and unsatisfactory ideas on animal instinct, &c. into a treatise on the diseases of the limbs and feet of horses. We are induced to the disagreeable task of making these remarks, and others of a similar nature, from a most zealous attachment to the interests and success of the veterinary faculty, which is much injured by the impolitic conduct and improper pretensions of some of its members. It is a general complaint, (see the Veterinary Transactions of the College,) that the public at large, the amateurs of horses in particular, are not sufficiently well disposed towards veterinary surgeons. Now, amongst others, there exist two reasons for this; one of them is, that of these surgeons, few of them are sufficiently practised in the use of the horse, and thence in-

competent

competent to judge in a variety of important cases; the other, that certain of them make groundless pretensions to a knowledge of this kind, which is, of all things, most disgusting to such as are styled jockies, or practised horsemen. All the speculative rules of progression laid down in the French and Italian schools will not advance a man one single step in the knowledge of English practical horsemanship, or in forming a useful judgment of that which is, amongst us, styled good action. On this subject, the aim of the French writers has tended more to speculative curiosity; that of the English, to theoretical and practical use. For the best proof of this, compare, as well as the writings, the horses, the equitation, the grooming and management of the two countries. It is nearly the same with respect to writings and practice purely veterinary, or medical and chirurgical.

This book contains one of the most curious advertisements which ever appeared out of a newspaper, or a shopkeeper's bill, and doubtless has excited many smiles; it is as follows: "The reader is requested to observe, that THIS TEEATISE has no connexion whatever with one published by JOHN LAWRENCE." Nevertheless there is an undoubted connexion; for, on a perusal of the two works, it will appear, that Mr. Richard Lawrence has borrowed very freely of his namesake.

The following observation in the Preface, without enhancing the value of the present work, lays the author, and some others, under real difficulties, which we should be happy to see removed, because we cordially wish those authors well: "The treatises written on the subject before that period (the establishment of the College) were found to be so fallacious in the description of diseases, as well as in the proportions of the drugs prescribed, that it was judged necessary to begin de novo." What, then, are the zealous labours of Gibson, continued through a course of more than forty years, and the sound doctrines of Bracken, so accurately skilled in the animal, both as a medical man and a horseman, to be totally thrown aside, and valued at nought? Does Osmer deserve no thanks, for reducing French speculative shoeing to that sound and rational practice, which, after all our affected attempts at novelty and originality, we are at last compelled to adopt? It was, indeed, an honourable and meritorious task in him who lately attempted a defence of the memory of these writers, and to rescue their valuable works from that oblivion, into which, from the most obvious, although not the most liberal motives, they were attempted to be cast. The works of these writers, take

 them

them with all their faults, are the grand original source whence we draw almost every thing that is valuable and useful in veterinary science; but of their pretended errors, and our original improvements and discoveries, where is the catalogue? where are they to be found? in the present treatise? Let the reader who desires information on that head compare and judge for himself, rather than rely implicitly on our word.

The first chapter, on the external conformation of the horse, is professedly taken from the French writers; and the following remark, page 19, will not greatly recommend the author to the experienced horsemen of England: "It has been generally the custom to attribute the source of motion principally to the fore quarters, under the idea, that if the fore quarters could move well and with speed, the hinder quarters must naturally follow. The fallacy of this doctrine may be easily exposed." Of course, the author places the chief dependance on the hinder quarters, than which nothing can be more contrary to all experience. To come at once to the point, let any judge of horses decide which would be the best goer, a horse with a good shoulder and ordinary hinder quarters, or one with an ordinary shoulder, but well made behind. The author has unfortunately adduced the instance of Eclipse's fore quarters, and calls them very ill formed. It is to be noted, that the shoulders, and indeed the whole form of this celebrated racer, used to be a stumbling-block to those who were no judges of the form of the race-horse. His ample shoulder, loins, and croup, often compared to those of a cart-horse, afforded him immense powers, whilst his substance was so posited, as in no degree to impede action; his shoulder, although thick, was amongst the most oblique and best calculated for speed. On this we have often reasoned with the living animal before us. To proceed with, and dismiss this part of the subject, which, in truth, is quite out of place here, and into which the author has adventured very rashly, and without any kind of training, whether upon racing or trotting ground—The keepers of race-horses will not probably esteem themselves much obliged to him for his sage advice (page 201) to their jockies, to ride their horses without pulling against them! Setting aside other views of the matter, totally out of the author's contemplation, it was incumbent upon him to point out the practicability of riding a race at all, without pulling hard at the horse; the motive of keeping a seat is the least consideration, and he who needs any great dependance that way, is in truth a poor jockey. It is totally untrue that the business of racing spoils

spoils the mouths of horses; in general, there are no pleasanter mouthed ones than come out of training.

Page 195. "Horses have been said to possess the ability of trotting eighteen miles within the hour: such horses do not trot, but run." This is totally against all experience; the shortest, that is, the most lasting trotters, being almost invariably fair trotters; those styled running trotters being more remarkable for speed than continuance. Equally absurd is the supposition, that fast trotting is acquired by use, or "that the same powers which enable them to excel in the trot, would also have rendered them fast gallopers if they had been employed in that action." The paces are naturally and totally distinct; and capital trotting and galloping, in the same animal, are incompatible. But enough of this.

What the author has given on shoeing, chap. iii. if not new, is very judicious and useful, with perhaps one or two exceptions: but let him not delude himself, or others, with the following groundless notion, which has been so often bandied about without consideration: "If the surface of the earth had remained in its verdant state, the necessity of an artificial defence for the horse's foot would not have existed." What? not in our moist and clayey country in winter, and with our severe exercise!

To shoe a perfect foot, page 45, "pare the wall just sufficient to make it level; pare the sole as much as will be necessary to remove the dead surface, which endeavours to detach itself by scaling off spontaneously; the frog to be cleared of its ragged edges; the heels not to be scooped out, nor notched in any way whatever. The shoe for a sound foot to be about three quarters of an inch broad in the web, and of an equal thickness from toe to heel; the surface next the hoof to be half flat and half bevilled, except at the heels, which should be entirely flat, so as to press on the bars as well as the heels. The nails should be eight in number, four on each side, and inserted principally near the front of the hoof, so as to leave the heels as much at liberty as possible."

On that common defect, the running thrush in the feet, the author seems to want experience; it, no doubt, sometimes arises from bad shoeing, but is, perhaps, much more frequently spontaneous; in which case it would be absolute distraction to attempt bringing the frog in contact with the ground, as advised in page 61. It is probably an erroneous idea, that keeping the frogs from the ground brings a defluxion upon them: it has generally a contrary effect,

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producing desiccation and diminution. The author is silent on the notorious fact, that the far greater number of horses cannot endure the concussion of the ground upon their frogs, and adopts the convenient word *pressure*; he, however, speaks very rationally concerning the natural use and intent of this part of the foot; and, past all doubt, it much enhances the worth of any horse to have thoroughly sound frogs. It is not sufficiently often, however, that we can obtain our desire in this particular, by the best shoeing from the most early period. The most zealous partisans of the late Professor Saintbel have long since given up their favourite theory as untenable.

Amongst the causes of grease, the very curious one is assigned of cutting the hair from the heels. The hair, indeed, is generally cut from those parts, in rough cart-horses, too late; that is to say, after grease has actually supervened, from the difficulty the horsekeeper finds in cleaning the skin through such an impenetrable mass of hair. The author labours the point in favour of retaining the hairs at some length, and very strenuously: had he witnessed the following circumstance, he would, with his (in this case) coadjutors the horsekeepers, have changed his opinion: In a certain mill-track, where eight large horses laboured constantly, so much dirt was raised, that it was found totally impossible to keep their heels clean and whole with the hair on.

In regard to the mischiefs derived to the legs of horses from declivity in the pavement, the opinion of Dr. Bracken is very properly adopted. This author, however, has gone much farther than the wary Bracken would have ventured; he has actually cured a nobleman's horse of windgalls, by setting him for six months upon a level pavement, page 92. A horseman would say, that, no doubt, one of his Lordship's level fields would have done the business with equal effect; and yet a good sharp day's work or two would cause the windgalls instantly to re-appear. The injuries consequent upon narrow stalls cannot be too often repeated. Cast-iron racks, and lofty stable doors, page 153, are an improvement much wanted in many stables.

If the following observation has been made before, it will merit repetition: "This being the natural process of respiration, it will not be difficult to conceive, how much it must be impeded when the saddle is girthed extremely tight, or too far back towards the flank; but this inconvenience does not end with the removal of the saddle, for the horse is constantly girthed

girthed with a tight circingle, whilst he is in the stable, with a view to keep up his belly. In either of these situations, respiration is carried on principally by the action of the diaphragm, as the intercostal muscles cannot perform their office. Old horses are so sensible of this inconvenience, that, during the act of girthing, they swell out their chests as much as possible; by which means the girths become slack when the chest returns to its former dimensions." Page 115. As to the discovery of a horse's age with correctness, after the period of eight years, we believe it to be a matter of much uncertainty, whether recourse be had to the lower, or the upper jaw; a thing, however, of no great consequence, since the signs of age are generally so obvious to the experienced eye. The plate of the teeth is ingenious and well executed.

Of the diseases of the limbs and feet, it is probable the author intended not much more than a short catalogue, since his method of treatment is given so little in detail, as not to be calculated for instruction, any farther than by general hints. On wounds, he follows the track of former good writers, exclaiming with much justice against the absurd praxis of farriers. He is too often unintentionally deceptious; for example, he tells us, because the *hawe* in the eye is a membrane, it is pernicious to remove it: true; but he ought to have added, that, when preternaturally enlarged, there often exists an absolute necessity for its partial excision. Again, in the case of bog-spavin, it is simply said, "repeated blisters will be necessary;" but who ever knew a bog-spavin cured by blisters? Mr. L. very properly explodes the stupid practice of blowing powdered glass into the eyes, and the equally stupid and useless barbarity of drawing the sole. He writes, in general, like a man of humane feelings.

ART. VI. *Six Letters on Electricity.* By the Rev. WILLIAM JONES, M.A. F.R.S. late Rector of Paston in Northamptonshire, and Minister of Nayland in Suffolk. Octavo. 68 pages. RIVINGTONS. 1800. Price 2*s*.

THE physiological disquisitions of the reverend author are well known to those who have been attentive to philosophical inquiries, and have been admired as well for the spirit of piety which they breathe, as for the ingenious researches which they contain; affording an instance, among many that might be quoted, that true philosophy shews us, in the strongest light,

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our continual dependance on a first great Cause, whose consummate wisdom it teaches us to admire. The present work, which is posthumous, is by no means equal to that alluded to either in a philosophical or literary view.

The first letter contains some curious circumstances concerning the history of electricity, which are not generally known, and which we shall present to our readers in the author's own words:

"Of the time at which electricity was discovered, I say nothing as yet, though it was very remarkable: the manner I can relate to you nearly as I received it thirty years ago from an intimate and respectable friend, who was a party concerned in the discovery, the late Reverend Granville Wheler, of Otterden Place, in Kent.

"There was an ingenious man, Mr. Stephen Grey, a pensioner of the Charterhouse, who delighted much in experiments. It was the practice, at that time, to rub a large tube of glass for attracting threads and other light bodies; and Mr. Grey having found that his tube would not act well but when perfectly clean and free from dust, stopped the open end of it with a cork. One day, when he had rubbed his tube and applied a thread to different parts of it, he observed that the thread went to the cork at the end as readily as to the glass of the tube. This taught him that the power of electricity was communicable from glass to other bodies. The steps he made, in consequence of this, were easy and natural. Instead of the cork, he fixed into his tube the joint of a fishing-rod, and discovered the same power to the end of it. At last he tried his whole fishing-rod, with a line of packthread and an ivory ball at the end of it, from an upper window; when the ball at the end was still found to attract light bodies as before. With this discovery he went full fraught to his patron Mr. Wheler, in the country, and repeated every thing with success as far as he had gone. But they determined to go farther; and for this purpose repaired to a long gallery above stairs, which encompassed three sides of the house; and having extended their line, the length of which required that there should be loops from the ceiling to support it, they tried the effect; but now there was no answer, and they were quite at a stand. But it so fell out, that they blundered upon a true method in consequence of their own false reasoning. These loops of ours, said they, are too thick and too heavy, (for, by the way, they had made a trial of iron wires;) our way will be to make the loops of the strongest line we can get, with the least weight and

and substance. On this consideration they gave the preference to sewing silk; and now all was right at once: but they still argued, that their success was owing to the smallness of their lines, not to the silk of which they were made. A few more experiments taught them to correct the mistake; and they discovered, that there were bodies of different constitutions, some of which would stop the power, while others would let it pass off freely and be dissipated: these we now call *conductors*. Thus the great distinction was opened between electrics and non-electrics. But every thing came out by accident: for Mr. Wheler assured me, that neither he nor Stephen Grey had ever reasoned right in any one instance that he could remember; so contrary were the effects of electricity to all the pre-conceived notions of philosophers.

"Mr. Hauksbee, an ingenious operator to the Royal Society at the beginning of this century, invented a method of increasing the power of glass, by mounting a globe so as to be turned by a wheel: and a globe being so contrived, as to be capable of being exhausted of its air upon an air-pump, the electric fluid began to display itself in a wonderful manner. Opake bodies, when illuminated by it within the globe, became transparent; for when the inner surface of the glass was coated with pitch or sealing-wax, the hand of the operator, which rubbed the globe, became visible through each of these substances.

"Both Hauksbee and Grey shewed a disposition very early to speculate upon their new experiments, as if they had discovered in them some alliance with the great moving powers in the system of the world. Grey was delighted with the prospect: but in the application of his experiments he was rather too hasty, and his haste made him inaccurate; of which the philosophers of the time, who had then lately set their whole affections upon a *vacuum*, took advantage to render his speculations inconsiderable: and with many practitioners the electric medium still kept the name of an *effluvium*; as if it had been emitted wholly by the glass, and were of little more account in the world than a common odour.

"In a short time it came to pass, by another singular accident, more remarkable than that which had happened to Stephen Grey, that Muschenbroek of Leyden discovered a new force, of which, from that time to this, it has troubled the learned to give any rational account; opinions being even now in agitation concerning it, which are in direct opposition to each other. Electricity had hitherto appeared as a simple

direct force, which could make its way through iron as easily as through a vacuum. But now there came upon the stage a new force which we may call *reverberatory*; because the fluid, instead of flying off forwards, as in common cases, is arrested, retained, accumulated; and flies back again with a great stroke and an explosive noise. Muschenbroek had suspended a glass vial of water at his conductor, and was electrifying it to try how long the water enclosed by the glass would retain its electricity: but, in doing this, he grasped the bottle with one hand to remove it, while his other hand touched the conductor; and in this instant he received a stroke through his arms and breast, attended with such a sensation as no man had ever felt before, and which he that has once felt will never forget. This was a wonderful fact; and as soon as Muschenbroek had made himself master of it, he reported it. The fame and the practice of it soon flew into every civilized part of the world. People of both sexes, and of all ages and conditions, repaired in crowds to see and receive this wonderful shock; and the public curiosity was so much awakened, that every body was ready to hear what writers had to say upon the subject. Dr. Watson, a physician, gained great reputation by his manner of treating it, and I heard several learned persons pronounce his work to be the best that appeared upon the occasion. He made no scruple to call the new power of electricity by the name of *elementary fire*, and his electrical machine a *fire-pump*."

In proceeding with the history of electricity, we cannot but regret that the amiable and pious mind of our author should have been inoculated with the political rancour which has lately estranged man from man, and sown the seeds of discord where harmony would have otherwise prevailed. In speaking of the identity of lightning and electricity, he says, "which of the two was first in bringing down fire from heaven; whether Romas of France, or Franklin of America, has not been well ascertained, so far as I have been able to learn: but let it be Dr. Franklin; for then the fact will be an ominous prelude to the business he was soon afterwards to do in the world, in drawing down the fire of civil war upon his country, and spreading the confusion of anarchy over the earth. The Frenchman may certainly put in his claim; for the omen will agree as well with his present national character: but we need not trouble ourselves in settling their respective shares: they have it all between them; there being no others who have so just a title as the American and the Frenchman to be called the incendiaries of the world."

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In the second letter he asks the question, "what is it that acts in electricity?" and he endeavours to shew, though in a manner by no means satisfactory to us, that it is the same with heat and light. But the only arguments that he adduces are, that both lightning and electricity set fire to combustible bodies, and that the light of electricity and that of the sun are alike refrangible. He does not, however, reflect, that we can set fire to a body by depriving it of its electricity. The heat produced by electricity seems more owing to the rapid commotion which it excites in bodies, and thus extricating the latent heat, in the same way that hammering smartly a piece of cold iron will make it red hot. In another part of the work he relates an experiment, which might have convinced him that electricity and heat were not the same. "Let a bar of iron," says he, "be made red hot, only in the middle; we shall find that the electric fluid will pass from end to end without interruption, nearly the same as if it were cold."

In the third letter, our author proceeds to inquire how heat or electricity acts to produce the phenomena; and after some sneers at systems, and new names, and particularly the antiphlogistic theory of chemistry, he gravely proposes the following theory of electricity:

"In that ocean of invisible elementary fire, wherein we live and move, we place a machine, and turn a globe or cylinder of glass. When the glass is turned about, the element, in which it revolves, follows it; as when a grindstone turns in a trough of water: and so long as the revolution of the fluid is uninterrupted, nothing is done; whence we might ignorantly conclude, that the glass revolves in nothing. But if we apply a cushion to the surface of the glass, and make a stoppage or dam, the medium, which could before flow freely, is now separated into two conditions, and consequently put out of its natural state. Part of it can pass the cushion, and part of it cannot. To the cavity within the glass none of it can escape; because glass is a substance through which it cannot pass freely, being partly hindered by the air incumbent on the inner surface of the glass, and partly by the structure of the glass itself, which is of such a constitution as not to admit it. The fluid therefore which surrounds the glass and moves with it, cannot be as it was before; it is stopt by the close contact of the cushion, and as it were *strained* into a new state; I say strained, for I believe this circumstance to be a chief part of the secret. When electricity first came into

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observation, it was natural to imagine, that the effect was excited by an *attrition* of the rubber upon the surface of the glass, either working upon the *air*, or putting the parts of the glass into an unusual agitation, so as to make them *emit effluvia*, &c. But farther experience shewed another thing: for if the separation takes place, the attrition is of little consequence. A rubber of a proper length, though it were but a line in breadth, would answer the purpose, provided the contact between that and the glass be as perfect as possible; which is greatly promoted by rubbing over it an amalgama, or mixture of zinc and quicksilver about the consistence of an unguent: or some *aurum musivum* may be used; than which nothing can apply more closely to the smooth surface of the glass, as is found by long experience."

According to this theory, however, an electric machine ought to work as well with the rubber insulated, as when a communication is made with the ground by means of a conductor, for that will not make the least difference in his *straining* operation. Of this difficulty he attempts the following very lame explanation:

"As soon as the separation commences at the cushion, there commences with it an *indraught* of the same fluid; which must be supplied through some channel, which forms a communication between the cushion and the body of the earth. A communication with the atmosphere is not sufficient: there must be a communication with some non-electric body: and that body must communicate with the earth itself, which on account of its magnitude can furnish a constant supply, without suffering any sensible alteration in itself; so the fluid comes freely from thence through the pores of any non-electric, in quantity sufficient for all our purposes, and at all times, as from an inexhaustible promptuary."

At p. 22, the author says, "it is a great entertainment to observe, how powerfully the internal parts of glass are affected, when the electric spark is repeatedly applied to them. Let a thin receiver of glass of some length be well exhausted of its air; then let the spark be repeatedly directed to one point of its superficies; after which, if it be removed into the dark, it will be seen to flash of itself by intervals for a considerable time; as if the parts of the glass had been disturbed in their natural situation, (as they certainly had,) and required some time to recover of their vibrations: in doing which they sometimes fly to pieces." This experiment, we imagine, will be easily explained,

plained, by any tyro in electricity; it by no means proves that the natural situation of the parts of the glass is disturbed, as he supposes.

We were much surprised to find him supporting the long-exploded doctrine of nature's abhorrence of a void. "It is an allowed law of nature," says he, "that from any space which is filled with any medium, nothing will come out till something is ready at hand to take its place. This used to be called nature's *abhorrence of a vacuum*. When the electric medium flows from the conductor of a machine, some other matter must have access to it, without which the efflux can neither begin nor continue. It has been a question with me, in which of these two the motion begins; or whether it begins in both at once, as when the opposite sides of a wheel begin to move in contrary directions at the same instant."

As a proof that there is an afflux as well as efflux of electric matter, Mr. J. relates the following experiment made by Dr. Watson: "He suspended upon silk lines both the machine and the man whose hand excited the globe; which cut off all communication with the earth: and in this situation the man and the machine produced little or nothing. But when a person standing on the ground touched the conductor with his hand, the man at the globe yielded sparks. This proves that the machine is without a supply, till it is furnished by the person who stands on the ground. What he furnishes comes in a direction towards the conductor; and this is what we mean by an afflux. To me this experiment either proves an afflux, or it proves that there is little use in recurring to experiments for information; and that experimental philosophy may be as uncertain as any other." It is evident, however, that in this experiment the conductor would be slightly charged positively, while the man who acted as the rubber would be electrified negatively; but this could only be carried to a small extent; for when the conductor had more than its share of electricity, it would not easily receive more from the man, who was rather in a disposition to attract it back, than part with any more; but when a person approached the positively electrified conductor, some of its superfluous electricity would be imparted to him, and then it would be in a state to attract more from the rubber, which would therefore be still more strongly electrified negatively, and appear to give, but really receive, stronger sparks.

Page 28, the author gives the following explanation of the Leyden experiment, or what he chooses to call the double force. "This shock happens, when an equilibrium, which had been interrupted,

interrupted, is suddenly restored. That an equilibrium is *restored*, nobody will wonder, because it is the effort of nature to preserve it. But how is it *interrupted?* Here lies the whole difficulty. I find then that glass, commonly supposed to be totally impenetrable, can be so only to a certain degree. That the fluid passes it with difficulty, is certain; but when it has done this, the two sides of the glass are in two different conditions: the medium is divided into its two constituent parts; which parts are by nature always mixed together in due (and perhaps in equal) proportion. These two will not part without difficulty, and under particular circumstances; and as soon as the way is open, they will unite again with violence; which violence is more or less, according to the difference which had taken place between them.

"Let us say then, that if across a current of electric æther, as it is conveyed from a machine, a square of thin glass be interposed, this æther is not absolutely stopt, but so checked, as to be divided into its two powers; which are now resident on the different sides of the glass, and kept there by the pressure of the air: for if a vacuum be adjoining to the upper side, which I call A, the glass will not be charged. By the action of the machine on the glass, and the re-action of the glass on the machine, things are brought to this state. The experiment is commonly made with a bottle or jar of glass, coated on each side in such a manner that the sides cannot communicate: but whatever the form may be, the sense of the experiment is still the same. When a communication is made between the two sides, they *neutralize* each other, like *acid* and *alkali*, which meet with a similar commotion."

This explanation, in our opinion, is unworthy of any serious notice.

Page 31, the author describes an experiment, which, he says, "seems decisive against *plus et minus*."

"Charge a Leyden bottle fully, with a chain hanging from the outer coating to the floor. When the bottle is charged as far as it will admit, unhook the chain from its bottom. The outside is then in the condition which is called *minus:* but from this minus, another bottle may be charged as the first was; and both in appearance will yield a like explosion."

To us the experiment appears to admit of an easy explanation on the Franklinean hypothesis. We must observe, however, that the experiment will not succeed, or only to a very trifling degree, unless the inside of the charged bottle communicate with the conductor. When the second bottle is applied, part of

of its electricity will pass out of the inside to the negative side of the first bottle, while the outside will attract an equal quantity from the hand, so that the second bottle will certainly become charged, but in a contrary order to the first, its inside being negative and the outside positive.

The author proposes to tame lions, tigers, and other ferocious animals, by the electric shock; but from the following circumstance which he relates, we should have little hope of success. "I had myself," says he, "a dog, a beast of strength and spirit, but of great good humour, who having felt it a few times, would never after endure the sight of a common vial; but would fly at the person who held it towards him, though it were his own master; so lasting is the remembrance of the sensation."

The fourth letter is taken up with the consideration of the qualities attraction and repulsion, and we meet with much of the scholastic jargon which used formerly to disgrace the pages of philosophy. Our author asserts, "that there is a subtile matter existing every where, in all places and in all bodies; and by what arguments soever it might once be discarded, it is now come again, and will remain with us to the end of the world; and he who thinks it may be left out, and that philosophy may be complete without it, is rather to be pitied than argued with."

In speaking of attraction, he says, that "it always was a phantom from the beginning, and I believe no more of it than I do of the stories about ghosts." Surely the author must be aware that the term attraction was used by Newton and others merely as an expression of a fact, without any respect to its cause.

The fifth letter is professedly on medical electricity, which is the most important, and to our readers the most interesting part; we must own, however, that what we had already seen of the work, did not afford any good grounds for expectation on this head; but humble as our expectations were, we have been disappointed. In presenting the reader with the following extract, we put him in possession of every thing in any degree important to the practitioner contained in this letter.

"The electric friction, or flesh-brush, is an excellent form for rheumatic pains and paralytic affections; and it occasions a thrilling sensation, by which the spirits are remarkably raised as by a cordial. But in cases where the *shock* is proper, it is the sheet-anchor. It completely restored the use of the limbs the first time I had an opportunity of trying it on an hemiplegia;

plegia; but the party was young, and of a strong frame, and the disorder arose from an accidental cold. Agues, after resisting the bark, have frequently been cured by it. Medicines are remarkably forwarded in their operation by the use of electricity. A blister may be made to run which did not run before; and a cathartic, if slow, may be made quick; sometimes very quick; which it may be useful to know in case of a stoppage. It is the only remedy for gutta serena, and very often succeeds. The fluid is generally used for gutta serena. I would observe upon the whole, that if a complaint is recent and the patient young, great things may be done: if the complaint is recent and the patient not young, something may be done. But if the complaint is of long standing and the patient not young, little can be done: yet even then there are cases, when an application of this remedy may palliate, and therefore be worth trying. It is now so far adopted by medical gentlemen, that an electric machine is reckoned a necessary part of the apparatus in hospitals; and many surgeons are furnished with one in the country; the ordinary use of which is in paralytic cases. It has been hinted to me however, that the cobwebs are too seldom brushed off from hospital machines, and that the general answer of the faculty has been, they are too old to go to school again. It may certainly be extended to many other disorders with advantage: and the practice is in the hands of ingenious men, who make proper observations, and keep journals of their proceeding in this part of philosophy. Many extraordinary cures have been performed by electricity, and several cases have been read and published by the Royal Society; but how it happens that physicians know so little of this wonderful power, I am at a loss to account. Every year presents some new empiricism to them, which rages for its time and is buried in oblivion. Magnetism has had its advocates, hemlock, inspiration of medicated airs, and now the nitric acid, and the tractors; but the cures by electricity stand uncontested, and the cases published (as a sequel to *George Adams*'s Treatise) on medical electricity are so strong, that no doubt can arise."

Having considered the application of electricity to the *microcosm*, or system of the human frame, the author proceeds, in his sixth and last letter, to apply it to the *macroscosm*, or frame of the world: with how much success he has done this, our readers will judge from the following extract, with which we shall conclude our account of this work:

"I have often amused myself, and I do so to this day, with

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considering my electric apparatus as a system similar to that of the heavens; where the sun is the grand electric globe, exciting all things to an active state; while the earth and its atmosphere are conductors, distributing and applying to all bodies contained within them the force and life they derive from the centre. *Kepler* formerly considered the sun as the great *magnet* of the world, with an attractive side and a repelling side; and that by the influence of *both* he carried things forward; but we are now upon better ground than he was. We have realities before us, and have no need to call in occult qualities to our aid. For if the sun be the beginning and end of a circulating matter in the heavens, then will every orb, however it may be placed, be situated between two powers: in which situation it can no more continue at rest, than the little sphere between the two powers of electricity. One of its hemispheres will be toward the sun, the other will be away from it: consequently the one will be in light, the other in darkness; the one will be heated, the other will be cold: they will therefore be in two different conditions. This nature never permits, without an effort to restore an equilibrium, which equilibrium, if destroyed as fast as it is restored, can never be restored at all; and the constant effort of nature to effect it, produces a perpetual motion. If the two powers are equally balanced, the orb between them will always move at the same distance, and the orbit will be a circle: if they vary, or prevail over each other alternately, the orbit will be elliptical, and the sun will be in one of the foci.

"You will say perhaps, that this solution may be admitted in the case of a primary planet; but what are we to do with the secondaries? For we refer the primary orbs to a source of light; but the secondaries to an opake body: and must not these cases essentially differ? So it was thought, and very rationally, at the beginning of this century: but electricity hath now taught us, that the effects are the same whether the central body be opake or lucid. The little sphere will revolve round an opake body, placed at any distance from the electric fountain. In the motion of a secondary orb, there is now no more difficulty than in that of a primary: and there is the same reason why the law of *Kepler* should take place on the secondary with respect to the primary, as on the primary with respect to the sun. We cannot indeed assign any reason, why the progress of a planet should be from west to east, rather than from east to west: but we may presume to say, why the motion, when it has once commenced in that direction,

will persevere in the same; from the causes which are known to act upon it. What these causes are, let us now consider.

"The earth, at its western, or evening edge, having been exposed throughout the whole day to the action of the sun; and the eastern edge but now coming out of the night into it, the eastern and western edge cannot both be in the same condition. This produces an inequality; which is all we want: for a force will thence be generated in the heavens on the western side, to propel the earth in its orbit. And with this direction in the earth the most ancient account of the creation seems to agree; where, in order of time, it sets the evening before the morning: which is proper, if the first impulse commenced at the western side of the earth. The greatest agitation of the day being on the west side of the meridian, there the power will chiefly act; and the earth will be moved toward that side where the action is weakest. But if this is to be effected by impulse, you may possibly observe, that it must require an immense impulsive force to carry forward with so much velocity a body of such magnitude as a planet. But in this we should argue like children: for though a planet be to our conception an immense unwieldy body; it is well known to philosophical men, that a force, which in the beginning is less than any assignable quantity, may amount to any thing required, if it be added to itself by continual increments, like the power of gravity.

"This, Sir, I must confess, is nothing more than a hasty sketch of one of the first and greatest operations in the universe: but of the principles in gross, on which it goes, I have no doubt. The forces employed in it are none of them petitionary; but real, and necessary, and adequate. I say they are necessary, because no motion can be continued in a *natural* way, if we suppose the first impulse to arise from any violent, artificial, or transient force: because such a force, as I have already observed to you, always changes from more to less; whereas the forces of nature are from less to more. You have a familiar proof of this doctrine every time a body is thrown upwards. A violent force carries it up, which is greatest at first; a natural force brings it down, which is greatest at last. And I will venture to add, that if the earth could be stopt in its course, its motion, when the obstacle was removed, would be renewed on its own principles: because a body, situated under such circumstances as the earth is, cannot remain at rest."

ART.

Art. VII. *The first Number of Veterinary Transactions, containing Observations on the Effects and Treatment of Wounds of Joints, and other circumscribed Cavities.* Published by Order of the General Meeting of Subscribers to the Veterinary College. Octavo. Egerton, London. 1801. Price 3*s.* 6*d.*

The present small publication, being the commencement of the Transactions of the Veterinary College, proceeds from the pen of the respectable Professor Coleman. It is written with much modesty, and unclouded with any of those lofty pretensions, to sanction which so much must naturally be required. In our late analysis of Mr. Whyte's ingenious publication on the same subject, we lamented that the Veterinary College had not hitherto acquired that degree of influence on the practice of the country, which such an institution seemed fully entitled to claim. We find these sentiments confirmed by Mr. Coleman; at the same time we fully rely upon his industry, philosophy, and patience, for going through with the good work. He must be well aware of the long-continued toils, as well as of the honour, of the final victory obtained by truth over inveterate and persevering prejudice. In the Preface it is said, "that the Veterinary College, for a time, must openly clash with the immediate interests of farriers. The farriers, however, are neither the only, nor yet the principal opponents with whom the College has to contend. In fact, the College has suffered very little from their opposition; it is the calumny of men in disguise; it is the evil report of grooms and coachmen, who are not generally known to be in any degree interested in the destruction of the College, from whom the institution is most likely to suffer. This numerous and formidable class of opponents are too often the sole and supreme directors in their masters' stables. The horses are usually shod, bled, and physicked, when and where, and in any manner, the groom recommends; and even those gentlemen who pay considerable attention to the treatment of horses, are frequently overcome by the constant opposition of their grooms or coachmen."

It was thought necessary by the founders and supporters of the veterinary institution, not to allow the servants of the College to receive any fees from the subscribers. This was, in some respects, a judicious law, and, on the part of the governors, very honourable, to prevent the grooms of the College paying unequal attention to the horses admitted into the stables; but it is also a regulation, that no fees or gra-

 tuities

tuities shall be given to the servants of subscribers, on bringing horses to, or taking them from the College, whilst "a part of every shilling paid to common farriers is, in some shape, returned to the groom, as a fee or perquisite."

Mr. Coleman here, doubtless, offers a very forcible explanation. As to the little respect paid, in this country of horsemen, to the veterinary science, and the general reliance on ignorant grooms and blacksmiths, it is as notorious as it is disgraceful. Some good observations on stable practice occur in the Preface; but we can scarcely agree with the Professor, when he says, "they over-rate his abilities, who suppose him competent to furnish new matter, well digested, and worthy of public attention once in the year." We are not, indeed, disposed, at this time of day, to the plea of the infancy of veterinary science, and are confident, that a mere plain transcript of established and rational practice would be of infinitely more service to practitioners in general, than that everlasting straining after novelty, which too frequently terminates in either the inutile, or the injurious, or the burlesque. The discovery of latent truths will be naturally consecutive of a painful research into what has been already known, and of an attentive practice.

We are sorry again to disagree with Mr. Coleman, whom we nevertheless respect as an enlightened practitioner. He asserts, that "the best remedies for the same diseases in the human subject, are not *commonly* successful in horses." On the contrary, we aver, from long experience, and the concurrence of the ablest judges this country has produced, that *they are commonly* so, with the usual exceptions which all general rules admit.

Impartiality and our duty to the public lay us under the necessity of stating, that the cases here offered to the veterinary faculty, are neither numerous nor of much novelty or consequence; nor does the treatment, although generally judicious, afford any particular interest. The contents are as follow:—Observations on Wounds of circumscribed Cavities—Case of a ruptured Ligament of the Knee-joint—Of a Wound of a large mucous Capsule of the fore Leg—Of an inflamed Vein in consequence of Bleeding—Case of a ruptured Theca and Tendon—Of an inflamed Vein in consequence of Bleeding—The same—The same—Rules of the College—List of veterinary Surgeons—Of Subscribers. Two plates.

In the anatomical part of the Observations, &c. or in the treatment of the diseased parts, nothing new is offered, with the

the exception, that the main purpose of these Observations seems to be the introduction of an insignificant novelty in our veterinary nomenclature, which, in our opinion, for more reasons than one, Professor Coleman had better have let alone. He decides, it seems, that *windgalls* ought to be called *mucous capsules*. Without stating our precise opinion, as to the mere propriety of the new name for windgalls, we shall just make a slight examination of the pretended new theory, and the old practice in the case; a subject which, in truth, has engaged much of our attention of late. The following sentences, from a respect for Mr. Coleman, we sincerely wish had been omitted. Speaking of *bursæ mucosæ*, page 10, he says, "it has not been generally understood, that the same bags exist in all horses when first foaled. Before the horse is domesticated they are seldom visible but by dissection, and from hence it has been inferred by *men unacquainted with the subject*, that these bags are first formed in consequence of disease." Again, page 11, "men not well acquainted with the structure, or the functions of mucous capsules, have occasionally opened them and let out the fluid." It happens, however, that men perfectly aware of the functions of the mucous glands have supposed, that the tumours called windgalls are first formed in consequence of disease, and that one particularly, who must be allowed to have possessed an ample share of both anatomical and medical knowledge, *occasionally opened windgalls, and let out the fluid.* It will make but little for Mr. Coleman's argument, that these *bursæ* were formerly called glands. Osmer says, "all tendons are enveloped in a sheath, wherein are situate many small glands, that are forced, by action of the tendons, to pour forth their mucus, which serves as oil to lubricate the same, and to keep them from growing dry and rigid, as otherwise they would do like any other cord or string." Page 71. Bracken says, "the cyst or bag is formed from the outermost covering or coat of the tendon." According to Gibson, "these swellings are not confined to the lower limbs only, but appear in divers parts of the body, wherever the membrane can be so separated, that a portion of air and serosities may be included within their duplicatures." From Bell, in his Anatomy of the Bones, &c. we learn, that "this glary liquor is the same with that which bedews the cellular substance and the cavities of the joints; and the provision of nature is so perfect, that *the occasions which require* BURSÆ *seem to form them by friction out of the common cellular substance.*" Mr. Coleman himself, in an analogous case, admits

admits a new organization; and, in fine, we feel rather inclined to adopt the old opinion respecting windgalls, namely, that they are, in Bell's language, formed for the occasions which require them; that they are a mere preternatural enlargement of the *bursæ mucosæ*. This however, at best, is but a matter of curiosity: on either supposition, the curative intention must be the same.

In the latter respect, we are still wider apart from the Professor. He supposes, page 12, that the danger of exposing the cavities of these organs has not been generally understood: if he means by this to include former writers of reputation, the supposition is erroneous indeed.

In page 11 we have the following remarks, but without any determinate advice on the subject: "The immediate effect of this operation, (to discharge the fluid from the windgalls,) is the total disappearance of the tumour; but if the edges of the wound do not unite by the first intention, great inflammation speedily takes place; and if the wound heals in the most favourable manner, the internal surface of the bag will continue to secrete a fluid, and the part will become as large, if not greater in bulk than before. The operation, therefore, of letting out the contents of mucous capsules, or, in other words, the opening of windgalls, *cannot succeed*; and sometimes the inflammation will be so great, as to endanger the life of the animal. These cavities have occasionally been opened by farriers with a sharp-pointed iron made hot; this mode is far less objectionable than others, as the coagulation of the fluids, from the application of the cautery, generally closes the orifice, and restores the cavity." Is it possible that Professor Coleman can be unapprized of two successful cases of dissected windgalls, one by Dr. Bracken, vol. ii. p. 216, the other by Mr. (John) Lawrence, vol. ii. p. 505? This latter case, related circumstantially, with its consequences, goes remarkably full to all the points in question, leaving very little to dread from the inflammation, or any other danger in the method of excision. As to the old superficial methods of the farriers, pricking tumours with awls, or firing into them, we can ourselves, from experience, not only vouch for their insufficiency, but for the mischiefs of the latter practice, by thickening the integuments, and rendering the horse still more stiff and lame than before; in the bog-spavin, particularly, we have repeatedly witnessed such effects.

In the use of the actual cautery to wounds, whether of the brute or human subjects, Mr. Coleman agrees perfectly with

 Dr.

Dr. Bracken; in whose Treatise he may find a case of sciatica in a woman successfully treated with the cautery.

Considering the frequency of swelled necks in horses, from the rough and injudicious method of blood-letting adopted by farriers, we are rather surprised at the silence of Mr. Coleman in that respect. Of what nature are those impediments which interdict the general use of the lancet?

Art. VIII. *An analytical View of a popular Work, on a new Plan, entitled Fountains at Home, for the Poor as well as for the Rich; with an Appendix, containing a short Address to the Colleges of Physicians and of Surgeons at Dublin.* By William Patterson, M.D. Member of the Royal Irish Academy, &c. &c. Octavo. 63 pages. Watson and Son, Dublin. 1800.

THAT Ireland has suffered greatly by the migrations of some of its principal inhabitants, is too well known to need any particular instances. The English watering-places, particularly Bath, Buxton, and Harrogate, are crowded with visitors from the sister kingdom, who, for health or pleasure, resort to these *sources*, where the latter, at least, may be found in abundance. Even at the bathing-places on our coasts, which do not possess any superior advantages to those of Ireland, no inconsiderable portion of the company are Irish. To endeavour, therefore, to point out to his countrymen equal advantages at home, was certainly patriotic in Dr. Patterson, whose benevolent intentions the reader shall have from himself.

"In a season of war," says he, "our invalids cannot go abroad with the requisite facility and safety, and therefore *must* stay at home; in a season of peace, called on to foster by their presence the arts of peace, they *ought* to stay at home; and the more contentedly in both seasons, as I expect to make it appear, that the object, the preservation or renewal of *health*, can be equally well, if not better, obtained in their own country, than in any other. The inducements which I hold out are derived from immutable causes; they are deduced from the bounties of Nature and Providence, are rooted in the earth and in the organization of man, and of course vary not with times and seasons. Fortunate indeed would it be for their country and themselves, that our rovers abroad were inspired with a modicum even of the domestic disposition of the Wakefield family,

family, *whose migrations were all from the blue bed to the brown.*"

We should have been highly pleased to have found in this work something adequate to the title, and what is expressed in this extract; but our expectations have been disappointed; for behold, on reading it, we found it nothing but a preface and table of contents of a larger work which the author proposes to publish. This preface is such a jumble of sense, and we had almost said nonsense, such an *olla podrida* of politics, religion, economics, &c. &c. seasoned high with the praises of Ireland, that, though the author's benevolence forms no inconsiderable part of the dish, it is so overpowered by the other ingredients, as to be almost concealed. The main object of the work is almost lost sight of, and the whole is a rhapsody interlarded with a number of good observations on a variety of subjects, not at all, or remotely connected with the avowed design. In a different kind of work, the following animadversions on certain *soi-disant* philosophers would have been very appropriate.

"Convinced, as I am, that the condition of mankind may be improved, and that an improvement ought to be attempted, still however I abhor the systematic doctrines which strike at the root of the established forms of society, and which tend to destroy the distinctions that have been venerated for ages. If I solicit the attention of the public to the serious consideration of the social relations of life, and to the investigation of the powers and expectations of man, I do not desire to intoxicate them with the wild reveries of some modern schemists. Far be it from me to preach up to my countrymen, that every man upon this globe shall be able in a certain space of time to sustain himself, and the helpless who depend upon him, by the labour of half an hour in every day; that intellectual vigour shall destroy the natural passion of the sexes; and that man shall not be subject to death, but live for ever, without suffering from the wastings of age or the ravages of disease.

"Some, who do not go so far as to say that we may be made to live for ever, scruple not however to assert, that art may be brought to such infinite excellence, that the life of man can be thereby protracted to an extraordinary, unbroken longevity. This miraculous state is to be attained by preserving the course of the blood in a pure, unadulterated, empyreal temperament and current, by means of *factitious airs*, so as not to be in the smallest risk of congelation by *the frost of old*

age.

age. Yet, on the other hand, in the true spirit of prophetical reverie, certain of these theorists conceive, that at some future period contagious vapours shall be emitted from subterraneous furnaces, in such abundance as to contaminate the whole atmosphere, and depopulate the earth! And 'thus they made 'themselves—*air*, into which they vanished'."

With respect to the laziness imputed to the Irish peasantry, we believe, with the author, that wherever they have had sufficient motives and encouragements to industry, they have not been wanting in exertion; but, as M. De Latocnaye properly observes, when a person has cause to apprehend that he may die with hunger, it is certainly better for him to remain idle, if the most laborious efforts will not preserve him from it. In this situation, it is likewise by no means unnatural for them to quaff, wherever they can procure it, a little of the *water of Lethe*, in order to forget their misery. If the poor, adds Mr. Latocnaye, (who travelled through Ireland, and minutely examined the situation of its inhabitants,) were convinced that labour would improve their situation, they would very soon lay aside the listlessness and indifference which proceed from despondency.

To the Irish has been attributed a ferocious disposition, often amounting to barbarity; but this, the author observes, with other gross charges, appears to be in reality ill founded. He allows, that they may be sometimes too vehement, but by no means naturally cruel. "Because fire," he observes, "sometimes produces conflagration, shall it be condemned and extinguished for ever, and man be prevented from enjoying its genial and salutary warmth? Latocnaye declares, that he spent his time in reality well in Ireland; and never passed it more agreeably: his ideas were enlarged: he became acquainted with a people of an interesting character, to whom their neighbours are strangers, and whom ill-disposed persons have been busy in vilifying and debasing for ages. And he repeats with pleasure, that, notwithstanding their faults and errors, they are more easily kept in the right path than any people he knew, when in the hands of skilful persons animated with a *pure spirit* of public zeal."

We shall present our readers with one extract more, which contains some ludicrous but not unjust strictures on quackery.

"*Quackery* has arisen to an enormous pitch in England; some of its prime supporters have got their emissaries in Ireland; and it may be apprehended that the *art* will soon extend its baneful influence not over the whole of this kingdom, but

to the remotest corners of the British empire. With what justice and necessity it is exposed and resisted in this work, will be rendered most evident by exhibiting a figure of a *Knight of the Puff*, which we shall take from a drawing made in the last century, and which is a true representation of one of the present day, if we except, that, instead of being overcharged in colouring, the tints are rather to be looked upon as softened in respect to the features of modern personages of the *quack-salving* tribe.

AN EMPIRIC

" 'Is a *medicine-monger*, *probationer of receipts, and doctor* ' *epidemic.* He is perpetually putting his medicines upon their ' *trial*, and very often finds them guilty of *manslaughter*; but ' still they have some trick or other to come off, and avoid ' burning by the hand of the hangman. He prints his trials of ' skill, and challenges *death* at so many several weapons; and ' though he is sure to be foiled at every one, he cares not; for ' if he can but get money he is sure to get off: for it is but ' posting up diseases for poltroons in all the public places of the ' town, and daring them to meet him again, and his credit ' stands as fair with the rabble, as ever he did. He makes ' nothing of certain secret diseases, but will undertake to cure ' them and tye one hand behind him, with so much ease and ' freedom, that his patients may surfeit and be drunk as often as ' they please, and follow their business, that is, wenches and ' him, without any inconvenience to their health or occasions, ' and recover with so much *secrecy*, that they shall never know ' how it comes about.

" 'He professes, *no cure no money*, as well he may; for if ' *nature* does the work, he is paid for it; if not, he neither wins ' nor loses; and like a cunning rook lays his bet so artfully, ' that, let the chance be what it will, he either wins or saves. ' He cheats the rich for their money, and the poor for charity, ' and he passes for a very just and conscientious man; for, as ' those that pay nothing ought at least to speak well of their ' entertainment, their testimony makes way for those that are ' able to pay for both. He finds he has no reputation among ' those that know him, and fears he is never like to have, and ' therefore posts up his *bills*, to see if he can thrive better ' among those that know nothing of him. He keeps his post ' continually, and will undertake to maintain it against all the ' plagues of *Egypt*. He sets up his trade upon a pillar, or the ' corner of a street—These are his warehouses, where all he ' has is to be seen, and a great deal more; for he that looks ' farther finds *nothing at all.*

" 'Like

" 'Like a *mountebank*, his business is to shew *tricks* and '*impudence:* as for the cure of diseases, it concerns those that 'have them, not him, farther than to get money. The first 'thing he vends is his own praise, and then his medicines 'wrapt up in several papers and lies. He baits his patient's 'body with his *nostrum*, as a rat-catcher does a room, and 'either poisons the disease, or him. If but one in twenty of 'his doses hit by chance, when *nature* works the cure, it saves 'his credit; for whosoever recovers in his hands, he does the 'work *under God*; but if he die, God does it *under him*; his 'time was come, and there is an end. He pretends to a *uni-'versal remedy*, that is such, as, when all men are sick toge-'ther, will cure them all, but till then no one in particular."

" To account for the general silence of the medical faculty on this topic of public abuse, it has been insinuated, 'that the 'regular professors of physic are interested in the dissemination 'of these spurious nostrums, the suppression of which would 'lessen the progress of disease, and, of course, diminish the 'number of patients who are ultimately compelled to seek 'relief from them, for the disorders brought on by quacks, 'mountebanks, empirics, &c.' But this is an insinuation, which, though seemingly countenanced by the silence of the faculty, I am convinced, is in reality unjust and injurious. On the contrary, it is more consistent with reason and truth to conclude, that both graduated and non-graduated regulars have hitherto forborne from exposing the artifices and dangers of quackery from a sentiment of contempt for the traders in it; from an apprehension that an ill-natured construction would have been put on their animadversions; and from a belief that an evil, which is 'a burlesque on the common sense of man-'kind,' never would have risen to such a height in an improved state of human intellect and society. Now, however, since it has grown to so monstrous and destructive a magnitude, I make no doubt but the faculty will exert themselves in taking some immediate and effectual steps to suppress it, for the honour of their profession, for the advancement of science, and for the safety of the individual."

We shall take our leave of this pamphlet, with the following extract, apologising to our readers for detaining them so long on this subject, and sincerely wishing that Dr. Patterson's proposed work may be equal to his patriotism and good intentions.

" In our subsequent labours in this field, we shall examine the nature of the climates and waters of the principal places in

 Great

Great Britain, and the continent of Europe, to which our invalids betake themselves, or are dispatched, for the preservation or recovery of health. We shall form a comparison between those places, and such mineral springs and general opportunities as Ireland affords for the same purposes. From the comparison, we shall draw our inferences; and we expect to render it manifest that our island furnishes such advantages as preclude the necessity of deserting our *fountains at home*. The miserable disease, DOMIPHOBIA, or *home-dread*, shall be described, and the best means proposed for the treatment of it. The HYDROMANIA, or *water-rage*, another deplorable malady, shall be considered, and approved remedies pointed out. The share which exercise, change of air, and variation of place have in the reputed advantages of foreign climes and waters, shall be investigated. Plain and easy methods shall be laid down to prevent us from being obliged to resort to '*inns and hostlers for health*,'—to enable us, in the affecting state of a disordered body or mind, to reap the benefits and enjoy the comforts resulting from '*relations dear, and all the* '*charities of father, son, and brother*.' We shall study to provide consolation and cure for the lowly and indigent in the lamentable case of want and infirmity—and to place before the rich and great such reasons as may put them out of *conceit* with foreign regions, on the score of health at least, and induce them to impart to their country the benefits flowing from their presence, counsels, and expenditures. The good man's heart is always where his duty and business are seated; which, from the nature of the human species, must be limited to a certain defined circle; *a stranger at home* cannot possibly perform the indispensable obligations which he is under to the community whereof, on the principles of the SOCIAL UNION, he is an indented and covenanted member—consequently, they who are addicted to rove and ramble out of their own country, particularly when that country affords all that a rational man can require, violate the principles of both divine and human law."

ART. IX. DARWIN's *Phytologia; or the Philosophy of Agriculture and Gardening.*

(Continued from page 341.)

IN the last Number we gave an account of the first part of this work; we now resume the subject, and intend to present

 our

our readers with an analysis of the second part, *On the Economy of Vegetation.*

The ninth section, which is the first of this part, treats of the *Growth of Seeds, Buds, and Bulbs.* The author begins by pointing out the resemblance between seeds and eggs, betwixt which, he says, there is the strictest analogy. He then proceeds to describe the manner in which seeds vegetate. "When the seed," he observes, "falls naturally upon the earth, or is buried artificially in shallow trenches beneath the soil, the first three things necessary to its growth are heat, water, and air. Heat is the general cause of fluidity, without which no motion can exist: water is the menstruum, in which the nutriment of vegetable and animal bodies is conveyed to their various organs; and the oxygen of the atmosphere is believed to afford the principle of excitability so perpetually necessary to all organic life; and which renders the living fibres both of the vegetable and animal world obedient to the stimuli which are naturally applied to them.

"Whence we may in some measure comprehend a difficult question; why the plume of a seed sowed upon, or in the earth, should ascend, and the root descend, which has been ascribed to a mysterious instinct; the plumula is stimulated by the air into action, and elongates itself where it is thus most excited; and the radicle is stimulated by moisture, and elongates itself thus, where it is most excited, whence one of them grows upwards in quest of its adapted object, and the other downward.

"The first source of nutriment supplied to the seminal embryon, after it falls from the parent plant, exists in the seed-lobes, or cotyledons, which either remain beneath the earth, and are permeated by the umbilical vessels of the embryon plant, which absorb the mucilaginous, farinaceous, or oily matter deposited in them, as in the bean, pisum; or the seed-lobes rise up into the air along with the young plant, as in the kidney-bean, phaseolus, become seed-leaves, and serve both as a nutritive and respiratory organ. These cotyledons or seed-lobes generally contain mucilage, as in quince-seed; or starch, as in wheat; or oil, as in line-seed. Some of these nutritive materials are probably absorbed unchanged, or dissolved only by the moisture of the earth; others are converted into sugar partly by a chemical process, and partly by the digestive powers of the young plant, as appears in the process of germinating barley, and converting it into malt: these reservoirs of nutriment are hence perfectly analogous to the white of the egg, a part

part of which is probably absorbed unchanged by the lymphatics of the young embryon, and a part of it converted into a sweet chyle for the nourishment of the chick, when it has acquired a stomach.

"If the seed be deprived of these cotyledons, soon after the root appears, it will continue to grow, but with less vigour, and is said to produce a dwarf plant from three to nine times less than the parent. Hence the seeds of plants, which are liable to produce too vigorous roots, and thence have not time to ripen their fruits in the short summers of this climate, or which fill our hot-beds with too luxuriant foliage, as melons and cucumbers, should in this climate be kept three or four years; by which part of the mucilaginous, or farinaceous, or oily matter of the cotyledons becomes injured or decayed, and the new plant grows less luxuriantly.

"Another source of nutriment for the seminal embryon of many plants exists in the fruit, which envelopes the stone or seed-vessel, after the growing fetus has burst its confinement, and so far resembles the yolk of the egg, which becomes a nutriment to the chick, after it has consumed the white, and eloped from its shell.

"When mature fruit, as an apple or a cucumber, falls upon the ground, it supplies, as it ripens or decays, a second source of nourishment, which enables the enclosed seeds to shoot their roots into the earth, and to elevate their stems with greater vigour. Hence fruits generally contain a saccharine matter, or juices capable of being converted into sugar, either by a spontaneous chemical process, as in baking sour apples; or by a vegetable process, as in those sour pears, which continue to ripen for many months both before and after they are plucked from the tree, as long as life remains in them; that is, till they ferment or putrefy; and lastly, by the digestive power of the young embryon, as above mentioned.

"If the seed be deprived of the fruit, it will indeed vegetate, but with less vigour. Hence those seeds which are liable to produce too vigorous shoots for this climate, as the seeds of melons and cucumbers, should be washed clean from their pulp, before they are hoarded, and preserved three or four years before they are sown in hot-beds. But those seeds, which are sown late in the season for the purpose of producing winter fodder, as the seeds of turnips, should be collected and preserved with every possible advantage; and on this account new seed is much to be preferred to that which has been long kept."

The following observation on the growth of wheat appears deserving of attention:

"Another

"Another peculiarity attends the growth of wheat and other grasses; the leaf, which surrounds and strengthens the stem by its foot-stalk, deposits at every lower joint a saccharine matter for the purpose of nourishing the ascending part of the young stem; and in the uppermost joint, I suppose, to serve instead of honey for the stamens and stigmas, as their flowers have no visible nectary; and as the scales of the flower may with good reason be esteemed a calyx rather than a corol, according to the opinion of Mr. Milne; as these scales attend the seed-vessel to its maturity, which the corol does not. Milne's Botanical Dict. art. Gramina.

"Owing to this secretion of saccharine matter at the foot-stalk of every leaf, and its collection round the joints of grasses, it happens that when these joints are surrounded with moist earth, and are placed but a certain depth from the air, new buds will put forth round these joints, and strike their roots into the soil. Whence the agrarian husbandman may derive great advantage from transplanting his wheat, after it has produced a circle of new stems from the first joint of the straw; for if he then parts and replants them an inch or two deeper in the ground, so as to cover the first joint of each of these additional stems, he may multiply every one of them four or six times, and thus obtain twenty or thirty stems from one original seed."

In speaking of the growth of buds, which may be termed the viviparous progeny of plants, the author observes, that these by inoculation or ingrafting on other stems of trees, or by being planted in the earth, become plants exactly similar to their parents. A small glass inverted over these buds, when set in the earth, contributes to ensure their growth by preventing too great an exhalation; otherwise they are liable to perspire more than they can absorb, before they have acquired roots: this the gardeners call piping a slip, or a cutting, of a plant. In this situation a greater heat may be given them, as in hot-houses, without increasing their quantity of perspiration, which ceases as soon as the air in the glass is saturated with moisture; and the increase of heat much contributes to the protrusion of their roots and new buds, as they can at the same time bear to be supplied with a greater quantity of moisture.

The pith, according to Dr. D. appears to be the first and most essential rudiment of a new plant, like the brain, or spinal marrow, which is the first visible part of the figure of every animal fetus from the tadpole to mankind. In those plants which have hollow stems, this central cavity, though not

not filled with the pith, or medulla, appears to be lined with it.

"About Midsummer," the author observes, "after the new buds appear in the bosom of every leaf, many authors have remarked that there seems to be a kind of pause in vegetation for about a fortnight, which they have ascribed to different causes. At this time I suspect the reservoir of nourishment for the new buds is forming about the roots or in the alburnum of the tree; and that the caudexes and umbilical vessels of the new buds are also at this time forming down the bark, and terminate in those nutritious reservoirs in the roots or new alburnum like the umbilical vessels called seminal roots, which are visible in many seeds.

"The roots of trees are at this time protruded with greater vigour, as observed by the ingenious Mr. Bradley, who on that account prefers the midsummer season for transplanting trees, if they are not to be removed to any great distance; and adds, that the new shoots in the following spring will put forth with much greater force, and the tree will thence be almost a year forwarder in its growth, than if it remains untransplanted till the winter. Discourses on Earth and Water. This seems to be owing to the destruction of much of the nutritious matter deposited in the roots for the use of the new buds, which is torn off in transplanting, and which can only be replaced about Midsummer, or soon after.

"Mr. Bradley further adds, that when trees are thus transplanted at Midsummer, no part of the top or branches, or foliage, should at that time be cut off; which well accords with the theory above delivered; as it is from the vegetable blood, which is oxygenated by its exposure to the air through the thin moist pellicle on the upper smooth surfaces of these leaves, that the nutriment for the expansion of the buds in the succeeding spring is secreted or produced; and hence, if these leaves are prematurely destroyed, the vernal growth of the buds must receive injury; as the reservoir of future nutriment for them will be less in quantity; but if some of the branches are lopped during the winter, the remainder will protrude more vigorous shoots, as their share of the reserved nutriment will be greater."

The following observations seem to us important and ingenious: "If a grain of wheat be dropped on the surface of the earth, and suffered to shoot down its roots, and to raise its stem, which is the process of nature, I suppose but one stem would

would be produced; as the first knot or joint of it would not be covered with earth, and could not therefore shoot down new roots; which are necessary in these plants to the production of new stems, which are not branches but suckers or root-scions.

"But if the grain be buried an inch deep in the earth, a shoot rises from the roots which issue from the seed, which is an elongation of the caudex, and puts forth a leaf in contact with the surface of the earth; this leaf and stem constitute the primary plant; and generate new buds, which put forth new roots descending into the earth; and thus three or four or more suckers, or new plants, arise round the original one, which was contained in the seed: hence the appearance of two roots, which some authors have named the seminal and coronal roots. The ingenious Mr. Tull seems himself to have been aware of this circumstance, as he says in his Husbandry, 'Late-planted wheat sends out no root above the grain before 'spring, but is nourished all winter by a single thread proceed-'ing from the grain up to the surface.'

"This explains the prodigious multiplication of the stems of wheat, which may be produced by transplanting it three or four times in the summer, autumn, and ensuing spring; for if it be so managed, that a second joint of each young stem be buried in the soil, or brought even into contact with it, so that new roots may strike down into the earth; the caudex of the leaf, which surrounds this joint, will generate many new buds, which will thus become suckers, or root-scions, and rival their parent; and may be again transplanted or earthed up three or four times with wonderful increase. Mr. Charles Miller of Cambridge sowed some wheat on the second of June 1766, and on the eighth of August one plant was taken up and separated into eighteen parts, and replanted; these plants were again taken up and divided between the middle of September and the middle of October, and again planted separately to stand the winter, and this second division produced sixty-seven plants. They were again taken up, and divided between the middle of March and the middle of April, and produced five hundred plants. The number of ears thus produced from one grain of wheat was 21,109, which measured three pecks and three quarters of corn, weighed forty-seven pounds seven ounces, and were estimated at 576,840 grains! Philos. Trans. vol. lviii. p. 203."

The tenth section is on *Manures, or the Food of Plants.* The author begins this very important subject by observing, that the

chyle in all animals is similar, consisting of water, sugar, mucilage, oil, with carbon, phosphorus, and calcareous earth. The sap juice of vegetables consists of water, sugar, mucilage, with carbon, phosphorus, and calcareous earth.

In the most early state of animal life, the embryon lives on a mucilaginous fluid with which it is surrounded, whether in the egg or womb; in its infant state the young animal is sustained by milk, which its stomach converts into chyle. "In their adult state animals are sustained by other vegetable or animal substances taken into their stomachs, which are there converted into chyle partly by a chemical, and partly by an animal process; as by a mixture of gastric juice with water and heat, some of these recrements of organic nature are decomposed, either into their simpler component parts, or sometimes even into their elements; while other parts of them are only rendered soluble or miscible with water; and are then drank up by the absorbents of the stomach and intestines.

"In this process of digestion much sugar is produced, which is probably immediately selected and drank up by the numerous mouths of the lacteals, or lymphatics; to which it is presented by the vermicular or peristaltic motions of the stomach and intestines. And as this ready selection and absorption of the sugar, as soon as it is formed, prevents it from passing into the vinous or acetous fermentation; it is probable that from the want of such a means of separating saccharine matter, as soon as it is formed, chemistry has not yet been able to produce sugar from its elements without the assistance of animal digestion, or vegetable germination.

"In this process of digestion," says our author, "I believe, a great part of the water, sugar, mucilage, and oil, which exist in vegetable and animal recrements, are not decomposed into their elements, but absorbed by being soluble or miscible with water; the carbon, and the phosphorus, and the hydrogen, are also, I suppose, dissolved in the other fluids by means of oxygen, and form a part of the chyle, without their being converted into gases; for when this happens to any excess in respect to carbon, it escapes from the stomach in eructations; and the same occurs to the inflammable air or hydrogen, if a part of the water becomes decomposed in the intestines; which, if it be not absorbed by its solution in other fluids, but acquires a gaseous state, is liable to escape below; though both these gases seem occasionally to revert to a fluid state from their aërial one in the stomach or intestines, and to be then absorbable by the lacteals or lymphatics.

"What

"What then is the food of vegetables? The embryon plant in the seed or fruit is surrounded with saccharine, mucilaginous, and oily materials, like the animal fetus in the egg or uterus, which it absorbs, and converts into nutriment; while the embryon buds of deciduous trees, which is another infantile state of vegetables, are supplied with a saccharine and mucilaginous juice prepared for them at the time of their production, and deposited in the roots or sap-wood of their parent-trees; as in the vine, maple, and birch; which saccharine matter is soluble and miscible with the water of the surrounding earth in the subsequent spring, and is forcibly absorbed by their root-vessels, and expands their nascent foliage.

"In their infantile state therefore is a wonderful analogy between plants and animals; and it is particularly curious to observe in the process of converting barley into malt by the germination of the seed, that the meal of the barley is in part converted into sugar by the digestion of the young plant exactly as in the animal stomach. The wonderful effect of vegetable digestion in producing sugar may be deduced from the great product of the sugar-cane and of the maple-tree in America; and the wonderful effect of animal digestion in producing sugar appears in patients who labour under diabetes. A man in the infirmary of Stafford, who drank daily an immoderate quantity of beer, and who eat above twice the quantity of food that those in health consume, voided sixteen or eighteen pounds of water daily, from each pound of which above an ounce of coarse sugar was extracted by evaporation."

The author next proceeds to consider the food of adult plants; and in this he finds the great and essential difference between the nutritive processes of animals and vegetables to consist. "The former," he observes, "are possessed of a stomach, by which they can in a few hours decompose the tender parts of vegetable and animal substances by a chemical process within themselves, conducted in the heat of ninety-eight degrees, with a due quantity of water, and a perpetual agitation of the ingredients; which both mixes them, and applies them to the mouths of the absorbent vessels, which surround them. Whereas a vegetable being having no stomach is necessitated to wait for the spontaneous decomposition of animal or vegetable recrements; which is indeed continually going on in those soils and climates, and in those seasons of the year, which are most friendly to vegetation; but is in other situations, and in other seasons, a slow process

in a degree of heat often as low as forty of Fahrenheit, (in which the rein-deer moss, moschus rangiferinus, vegetates beneath the snow in Siberia,) and often without an adapted quantity of water to give a due fluidity, or any mechanical locomotion to present them to the absorbent mouths of their roots; or in still worse situations adult vegetables are necessitated still more slowly to acquire or produce their nutritive juices from the simpler elements of air and water, with perhaps the solutions of carbonic acid and calcareous earth, and perhaps of some other matters, with which one or more of them abound.

"But M. Hassenfratz found, that the vegetation of those plants was imperfect, which had not been suffered to grow in contact with the earth; as they never arrived at such maturity as to produce fruit; and were found on analysis to contain a less portion of carbon, than other plants of the same kind. The experiments were tried on hyacinths, kidney-beans, and cresses.

"Hence the other great difference, which exists between these two extensive kingdoms of nature, is, that the larger and warmer blooded animals certainly, and I suppose all the tribes of insects, and of colder blooded creatures also, cannot exist long on air and water alone, except in their state of hibernal torpor. The nearest approach to this is however seen in some fevers, where water alone has been taken for a week or two, and yet the patient has recovered; and there is a well-attested account of a numerous caravan, which having lost their route, or their provisions, are affirmed to have lived some weeks on gum arabic and water alone.

"Vegetables, on the contrary, as above mentioned, can exist, though in a feebler state, on water and air alone, with the carbonic acid, and perhaps other invisible solvends, which those elements unavoidably contain. This I suppose to be owing to the low degree of heat, which they produce internally, and to the slow circulation of their blood; from both which circumstances less nutriment is expended, as by animals which sleep in winter."

The subject which next engages Dr. D.'s attention, is an inquiry into the kinds of matter best fitted for supplying adult vegetables with nourishment, and most necessary to their composition. He then examines what of these substances they can absorb without previous decomposition; and lastly, how the animal and vegetable substances, on or in the soil, may be best decomposed, so as to be in a fit state for absorption by the vegetable. Among the different kinds of food he enume-rates

rates air, water, carbon, and phosphorus; into the consideration of each of which he enters so very fully, that our limits will not allow us to follow him.

In speaking of the manner in which the solid carbon, that is found on the surface of the earth in the form of black mould, morasses, decaying vegetables, and limestone, is rendered soluble, so as to be capable of entering the fine mouths of the vegetable absorbents, he observes, that the carbon which exists in the atmosphere, and in limestone, is united with oxygen, and thence becomes soluble or diffusible in water; and may thus be absorbed by the living action of vegetable vessels; or may be again combined by chemical attraction with the lime, which has been deprived of it by calcination.

When mild calcareous earth, as limestone, chalk, marble, has been deprived of its water and of its carbonic acid by calcination, it becomes lime. Afterwards when it is cold, if water be sprinkled on it, a considerable heat is instantly perceived; which is pressed out by the combination of a part of the water with the lime; as all bodies, when they change from a fluid state to a solid one, give out the heat, which before kept them fluid. At the same time another part of the water, which was added, is raised into steam by the great heat given out as above mentioned; and the expansion of this steam breaks the lime into fine powder, which otherwise retains the form of the lumps of limestone before calcination. But if too great a quantity of cold water be suddenly added, no steam is raised; and the lump of lime retains its form; whence it happens, that some kinds of lime fall into finer powder, and are said to make better mortar, if slaked with boiling water than with cold.

On this account, the lime which is designed to be spread on land, should previously be laid on a heap, and either suffered to become moist by the water of the atmosphere, or slaked by a proper quantity of water; otherwise, if it be spread on wet ground, or when so spread is exposed to much rain, the heat generated will be dissipated without breaking the lumps of lime into powder; which will then gradually harden again into limestone, disappoint the expectation of the agricultor, and afflict him with the loss of much labour and expense.

One of the great uses of calcareous earth, the author, with much appearance of probability, supposes to consist in its uniting with the carbon of the soil in its pure or caustic state, or with vegetable or animal recrements during some part of the process of putrefaction, and thus rendering it soluble in water,

water, by forming a kind of carburet of lime, somewhat like an hepar sulphuris, produced by lime and sulphur, by which process he imagines the carbon is rendered capable of being absorbed by the lacteal vessels of vegetable roots.

The black liquor which flows from dunghills may, he thinks, be a fluid of this kind; or the carbon may be simply supported in water by mucilage, like the coffee drank at our tea-tables; or it may be converted into a hepar carbonis by its union with the fixed alkali of decaying vegetable matter, or by the volatile alkali which accompanies some stages of putrefaction.

A second mode in which lime serves the purposes of vegetation, he believes to be its union with carbonic acid, and rendering it thus soluble in water in its fluid state instead of its being expanded into a gas; and that thus a great quantity of carbon may be drank up by vegetable absorbent vessels.

A third mode by which lime promotes vegetation, he thinks, may be ascribed to its containing phosphorus; which by its union with it may be converted into an hepar, and thus rendered soluble in water, without its becoming an acid by the addition of oxygen. Phosphorus is probably as necessary an ingredient in vegetable as in animal bodies; which appears by the phosphoric light visible on rotten wood during some stages of putrefaction: in which he supposes the phosphorus is set at liberty from the calcareous earth, or from the fixed alkali, or from the carbon of the decomposing wood, and acquires oxygen from the atmosphere; and both warmth and light are emitted during their union. But phosphorus may perhaps more frequently exist in the form of phosphoric acid in vegetables, and may thus be readily united with their calcareous earth, and may be separated from its acid by the carbon of the vegetable during calcination, and also during putrefaction, which may be considered as a slow combustion.

"There are," he observes, "other uses of lime in agriculture, which may not be ascribed to it as a nutritive food for vegetables, but from its producing some chemical or mechanical effects upon the soil, or upon other manures, with which it is mixed; as first, from its destroying in a short time the cohesion of dead vegetable fibres, and thus reducing them to earth; which otherwise is effected by a slow process, either by the consumption of insects, or by a gradual putrefaction. This is said to be performed both by mild and by caustic calcareous earth, as in the experiments both of Pringle and Macbride. It is said that unburnt calcareous earth forwards the putrefaction of a mixture of animal and vegetable matter; but that

pure lime, though it seemed to prevent putrefaction, destroyed or dissolved the texture of the flesh. Thus I am informed, that a mixture of lime with oak-bark, after the tanner has extracted from it whatever is soluble in water, will in two or three months reduce it to a fine black earth; which if only laid in heaps, would require as many years to effect by its own spontaneous fermentation or putrefaction. This effect of lime must be particularly advantageous to newly enclosed commons when first broken up.

"Mr. Davies, in the papers of the Society of Arts, vol. xvi. p. 122, asserts, that on a common, which had been previously covered with heath, but was otherwise very barren, the effect of lime was very advantageous for about ten years, during which time the vegetable roots might be supposed to have been dissolved and expended; but that a second liming he observed produced no good effect. It is probable the good effect might not be so great, but I should doubt the circumstance of its producing no good effect at all.

"Mr. Browne of Derby has also an ingenious paper in the Transactions of the Society of Arts, in which he asserts, that recent vegetables, as clover, laid on heaps and stratified with fresh lime, are quickly decomposed, even in a few days. The heat occasioned by the moisture of the vegetables uniting with the lime I suppose quickens the fermentation of the vegetable juices, and produces charcoal in consequence of combustion, similar to that frequently produced in new haystacks, which, if air be admitted, burst into flame.

"Secondly, lime for many months continues to attract moisture from the air or earth; which it deprives, I suppose, of carbonic acid, and then suffers it to exhale again, as is seen on the plastered walls of new houses. On this account it must be advantageous when mixed with dry or sandy soils, as it attracts moisture from the air above, or the earth beneath; and this moisture is then absorbed by the lymphatics of the roots of vegetables.

"Thirdly, by mixing lime with clays it is believed to make them less cohesive; and thus to admit of their being more easily penetrated by vegetable fibres.

"Fourthly, a mixture of lime with clay destroys its superabundancy of acid, if such exists; and, by uniting with it, converts it into gypsum, or alabaster.

"Fifthly, when lime is mixed with a compost of soil and manure, which is in the state of generating nitrous acid, it arrests

arrests the acid as it forms, and produces a calcareous nitre, and thus prevents both its exhalation and its easy elutriation.

"And lastly, fresh lime destroys worms, snails, and other insects, with which it happens to come in contact, and with which almost every soil abounds.

"The great and general advantage of lime in all soils and all situations, except some of those which are alredy replete with calcareous earth, or are too moist, can only be understood from the idea already mentioned of its supplying actual nutrition to vegetables; and this seems more probable, as it contributes so much to the melioration of the crops, as well as to their increase in quantity. Wheat from land well limed is believed by farmers, millers, and bakers, to be, as they suppose, thinner skinned; that is, it turns out more and better flour; which I suppose is owing to its containing more starch and less mucilage.

"Hence we perceive another very important use of lime in cultivation of land may be owing to its forwarding the conversion of mucilage into starch, that is, to its forwarding the ripening of the seed; which is a matter of great consequence in this climate of short and cold summers.

"In respect to grass-ground, I am informed, that if a spadeful of lime be thrown on a tussock, which horses or cattle have refused to eat for years, they will for many succeeding seasons eat it quite close to the ground; which is owing, I suspect, to the grass containing more sugar in its joints; or to the less acidity of all its juices."

(To be concluded in the next Number.)

FOREIGN BOOKS.

ART. X. *Traité de l'Inoculation vaccine, avec l'Exposé et les Resultats des Observations faites sur cet Objet à Hannovre, &c. &c.:* i. e. *A Treatise on the vaccine Inoculation, together with a particular Account of the Observations on this Subject, with their Result, made at Hanover, and in the Neighbourhood of that Capital.* By M. BALHORN, M.D. Physician to the Court, and M. STRÖMEYER, Surgeon to the Court. With plates. Octavo. GUILLAUME REIN, Leipsic; DEBOFFE, London. 1801. 6*s*.

THE patrons of the vaccine inoculation in this country cannot but view with peculiar satisfaction, the numerous and successful attempts which have been made to introduce this beneficial

beneficial practice into foreign lands; all of which, in proportion as they experience the advantages arising from this excellent discovery, will acknowledge with gratitude, the zeal and ability which brought it to light, in this its parent country.

The work before us is interesting in several respects; it comes from the most respectable authority; it contains much valuable matter, (though, perhaps, not much new information to those who attend to the progress of the cow-pox in this country;) and it is written with a spirit of candid inquiry that is highly favourable to the authenticity of the whole. We shall, therefore, give as accurate an analysis of the work as shall seem necessary, and occasionally present our readers with what may appear new or particularly interesting.

The authors have preferred publishing it in the French language, "as it is their earnest wish that this excellent discovery may spread universally, and particularly that they may be favoured with the remarks of several eminent men in their correspondence, to whom this language is more familiar than the German." The work is dedicated to Dr. Jenner, the first discoverer of the vaccine inoculation; and to Dr. de Carro of Vienna, the first promoter of this discovery in the Austrian dominions.

In looking over the preface, one circumstance struck us considerably; it is the very great frequency of a vaccine eruption subsequent to the entire and regular course of vaccine inoculation, which the authors state to have occurred during the course of their practice. They observe, that "Mr. de Carro, of Vienna, has not met with these subsequent eruptions a single time out of an hundred patients inoculated with the vaccine; whilst at Hanover, out of ten subjects, a proportion of eight or nine have experienced this subsequent eruption, and this still continues." The authors are willing to attribute this to a difference in the nature of the virus sent from London, and from the country; a conjecture which we do not think will be verified by later observation. They add, in a note, that at Paris this subsequent eruption has not been once observed in one hundred and fifty inoculated subjects. Now we believe that the original stock of the vaccine matter propagated in Paris was taken in London; and certainly Paris, as a metropolis, is full as likely as London to deteriorate the nature of the vaccine virus, if this were possible.

It appears, that during the whole period of the introduction of the vaccine inoculation at Hanover, a very severe and

 general

general small-pox prevailed in the town and its neighbourhood. The advantage which this would afford to the introduction of the cow-pox is somewhat ambiguous. On the one hand, it would materially assist, by the alarm which a severe small-pox always occasions, and by presenting numerous instances of this terrible disease in its worst form; but, on the other hand, it would be impossible to guard against that mixture of the diseases, which was so perplexing before it became well understood, and which could not fail of prejudicing the uninformed against the utility of the vaccine inoculation as a substitute. Accordingly, we find in this work numerous instances of vaccine inoculation rendered futile by a previous contagion of small-pox lurking in the body; and the accurate observation of the authors of this work has led them to the true criterion of a previous infection, namely, a want of the inflamed areola, and an imperfect progress in the pustule of the vaccine inoculation. The remarks which the authors give on this subject are so clear and accurate, that we shall present our readers with a translation of them.

"If," they observe, "the inoculated vaccine pustule is not surrounded with that fine circular inflammation which generally shews itself on the tenth day after inoculation; and if after this time a suppurative eruption appears, there is no doubt that the patient was previously infected with the contagion of small-pox before the vaccine inoculation was undertaken. In this case, the habit of body being already altered by the variolous contagion, the vaccine virus can only produce an imperfect effect; for experience shews that it occasions no specific effect at all on those who have already had the small-pox. Therefore, when vaccine inoculation is performed on a patient a little time after his receiving small-pox infection, a pustule is observed, it is true, on the part inoculated, which for the first days proceeds in a regular progress, and even comes to contain pure and genuine vaccine matter, and therefore deserves the name of a perfect *vaccine* pustule; but as the period approaches in which it ought to assume the circular inflamed areola, it then begins to take the form of a variolous pustule, and even its nature to change to variolous; and to this change is to be attributed the want of the inflamed areola."

The authors then proceed to explain, from an admixture of the two diseases, and a previous variolous infection, some of the apparently anomalous cases, and especially that which proved fatal, given in Dr. Woodville's first and interesting publication

publication on the subject. We shall not detain the reader longer on this topic, as this explanation has been for some time fully understood, and acquiesced in, in this country; but it serves to shew the attention with which the authors of the work before us have considered every part of their subject.

Count Kielmansegg, of Hanover, has added one to the numerous cases given by Dr. Jenner, of the length of time in which the cow-pox has proved a preservative against variolous contagion, whence its preservative powers *through life* may fairly be inferred. A woman in the neighbourhood of Ratzebourg remembers to have had, thirty years ago, the cow-pox, the marks of which still remain on her hands. She caught it in milking a diseased cow. Afterwards she became the mother of a numerous family, of whom six had the small-pox at different times, all of whom she nursed without herself taking the infection.

The authors complain, that the vaccine inoculation has suffered by falling into ignorant hands, who have taken no care to observe the progress of the disorder; by which means several spurious or imperfect cases have occurred, the subjects of which, afterwards taking the small-pox, have contributed to throw discredit on the practice.

Another complaint they also make, which we shall transcribe, as we believe it is one in which many practitioners residing in London, or where vaccine inoculation is much practised, have reason to join. "We cannot any longer conceal our surprise and dissatisfaction at the impoliteness and carelessness of so many persons, to whom we have sent vaccine matter at their particular request. They have not condescended either to acknowledge the receipt of the matter, or the success of their operations with it, or to repay our expenses. We have sent hundreds of glass plates and silver needles without requiring any previous reimbursement for the expense. One parcel of vaccine matter, sent to Warsaw, cost us near a florin for carriage; yet we have received but very few answers from those for whom we have taken so much pains. We therefore declare, that, for the future, we shall not send any matter to any one who is a stranger to us, unless their letters contain at least a florin; and if their residence is at a very great distance, the price must be increased in proportion to the distance."

So much for the authors' introduction: we shall now proceed to the work itself.

 The

The first attempts to introduce the vaccine inoculation in Hanover were few, and the difficulties which were experienced were considerable. It was not till the beginning of 1800 that it began to spread rapidly, and to find numerous supporters, when, as we have already mentioned, the town was alarmed with a very general and fatal small-pox, and likewise when the vaccine inoculation was making a rapid progress in France, Vienna, Geneva, and other parts of the continent.

It appears, that the authors inoculated in the beginning of 1800 more than five hundred persons; and by distributing matter to the other medical men of the place, they conclude that they may fairly reckon on having at least one thousand persons inoculated in the town by the 1st of November in the same year. They began with matter sent by Drs. Jenner and Pearson, which arrived in a very active state, and continued the inoculations from their own stock.

Among the inoculated were persons of every age and situation in life, and in none of them was any alarming symptom produced. All those who had the cow-pox in a *perfect* and *regular* manner have entirely resisted the infection of small-pox; but several of those who were inoculated would not take the infection. It appears to them that several diseases of the skin, and especially the itch, indispose the person who has it to receive the vaccine infection.

Much of the first part of this work is taken up with explaining several cases of small-pox occurring after imperfect vaccine inoculation, which, for a time, kept up the prejudice against the new disease. These were highly interesting on the spot, but would afford neither entertainment nor information to our readers. A very full and accurate description of the regular progress of vaccine inoculation, from day to day, is then given. It is worthy of remark, however, that the authors add an account of the subsequent vaccine eruption as part of the progress of the disease; so that a person who should merely cast his eye on this part, would suppose that vaccine inoculation never terminated without this eruption; a circumstance that would place the disorder in a very different and much less favourable light than that in which we are accustomed to view it. As, however, these gentlemen have unfortunately had occasion to observe this subsequent eruption so constantly, we shall give their very accurate description of it. We shall take up the journal of the progress of inoculation at the thirteenth day.

"13th

"13th and 14th days. The pustules" (from inoculation) "are now completely covered with a brownish yellow crust. Between the 13th and the 18th day, (very seldom sooner,) there appear on the body, the face, and particularly the fore arm, small, detached, elevated spots, which, for the first twenty-four hours, might be taken for a recent eruption of small-pox. This eruption is preceded by a degree of restlessness; diarrhœa, or vomiting. This vaccine eruption consists of little sharp swellings, somewhat elevated, red, and surrounded with a ring of a very lively red. This latter, however, disappears in twenty-four hours, and leaves little spots of a pale red, somewhat elevated, resembling the bite of insects, and which do not disappear till after four, five, or six weeks. Often these spots have a transparent point in them, in which case they contain an aqueous humour, almost imperceptible: this, in a few days, changes into a crust about the size of a pin's head. This eruption is not, however, a circumstance absolutely necessary to ensure the success of a complete vaccine inoculation; many children have it not, and yet are perfectly free from hazard from variolous contagion. We have observed this eruption on three subjects to come on the sixth day after inoculation, before the inoculated pustule had arrived to maturity, and before the access of the slight fever which generally attends the appearance of the characteristic inflamed areola round the inoculated part. This vaccine eruption is often sprinkled with red-brown spots, of the size of half an inch, which disappear in twenty-four hours. Many persons experience some uneasiness before the appearance of this eruption, having either a slight diarrhœa, or a bilious vomiting; and, in general, we are disposed to suspect that the secretion of bile is stronger at this period, and that the vaccine matter is thrown particularly on the stomach and intestinal canal."

The authors then proceed to mention, that this eruption sometimes, though rarely, enters into suppuration, and they lay down the characteristic marks by which this pustular eruption may be distinguished from the genuine small-pox. These are, 1st, the pustules of the vaccine eruption are smaller than those of small-pox: 2d, the matter which they contain is more lymphatic than purulent: 3d, their number is in general less: 4th, they have not that shrinking-in at the top which small-pox pustules usually shew before entering into suppuration: 5th, the crust or scab which is left is smaller, more tender, and yellow, in the vaccine eruption: 6th, many days after their drying up (which happens on the sixth

sixth or seventh day) they leave hard knots: and, 7th, these knots disappear at last without leaving any pitting or scar, but only a brown spot, which gradually fades away.

From what has been observed, the authors remark, that the vaccine inoculator should continue his observations on his patient for at least four weeks, on account of the probability of this subsequent eruption; an eruption which, they observe, has not been sufficiently observed, nor described by the English physicians. In justification of the medical men of our own country, we may observe, however, that this subsequent eruption, in the form stated by the Hanover inoculators, is so rare here, that we believe but very few of the number of those who use vaccine inoculation have ever remarked it. Why it should have been so frequent at Hanover, and no where else, we cannot pretend to determine.

The authors then proceed to give full and particular directions with regard to the method of performing vaccine inoculation, which they have found to ensure success with the most certainty. It has been, and still is a question undetermined with the practitioners of this country, how late efficacious matter may be taken from the vaccine pustule. The evidence of the Hanover inoculators is, however, very decided on this subject; they declare, that "every inoculation made with matter already entered into suppuration has failed of success, and has only produced some equivocal appearances, but entirely deprived of the characteristic signs of the true cow-pox." Therefore they prefer taking matter from the pustule from the seventh to the tenth or sometimes the twelfth day, before the depression of the pustule has disappeared, but never after it has assumed a yellow colour. The directions for performing the operation are such as every practitioner in this country must be acquainted with. Of course, they prefer inoculating with a lancet dipped in fresh matter still fluid, when a patient in the disorder can be procured.

The following reasons, alleged by the authors, why the efficacy of the vaccine matter is so difficult to be preserved after the virus is dry, will perhaps be thought too refined, and not very satisfactory. They are, 1st, that the nature of the vaccine matter, at the period in which it is most active, and when it should be taken for inoculation, is almost entirely aqueous; it then perfectly resembles the tears, or the serous humour drawn by a blister. Hereby it is seen, that the virulent particles of the vaccine matter are neither purulent nor solid, but that they have very little consistence; in short, that *water is their*

true

true basis. Hence it is easy to explain why this matter has so little efficacy when dry; for its basis being aqueous, it is evident that, when dry, it cannot contain so many virulent particles, and consequently it cannot be employed with so much success as when fresh and moist.

"2d. The vaccine virus is very volatile, very mild, and much less acrid and penetrating than that of the small-pox. This is shewn in a convincing manner by the superior mildness of the cow-pox in the whole of its progress.

"3d. The *very operation* necessary to collect a quantity of vaccine matter requires many cares and precautions. We think that proper matter can only be taken from the pustules formed by inoculation, and only during the short time in which it remains unaltered by suppuration."

It appears singularly loose reasoning to assert, that water is the basis of the vaccine virus, because this virus is considerably aqueous; neither is its diminished efficacy, when dry and again moistened, any proof of the former assertion, since the very circumstance of its having dried implies that it has been a longer time out of the pustule than recent and fluid matter, which we think has much more to do with the degree of efficacy than a mere substraction of the aqueous parts. An experiment made in this country, of preserving vaccine matter fluid, simply by inserting it in a small hole drilled in glass, and afterwards, when full, covering it with care, shewed, by the failure of inoculation, (as far as a single experiment can shew any thing decisive,) that there is some tendency to change, in the virus itself, and to lose its peculiar power of communicating the disease, independent of any substraction of any of its particles.

We might too object against the term *volatile*, which the Hanover practitioners apply to the vaccine virus. We see no manner of proof of its *volatility* in the strict sense of the word, which is, that of being ready to fly off in a gaseous or vaporous form; but all that we have any proof of is, merely, that its efficacy is soon lost; whether from the loss of any more subtle particles, or from any internal and spontaneous change, we are not yet able to determine.

The method of preserving vaccine matter which the authors of this work prefer, is to open with a lancet the pustule which is to furnish the matter, to soak some cotton or lint in it, and to put it immediately in a small cavity made in a plate of glass, over which another flat piece of glass is made to fit accurately. To preserve the matter from the contact of air, the inner sur-

 face,

faces of the glass are covered with a slight coating of cerate; the glass plates are then pressed together, and the edges are also closed with a little of the same cerate melted over a candle. The plates are then tied crossways with thread, and the edges again sealed with a solution of white wax in pure spirit of wine. It is to be observed, that if the inner coating of cerate were omitted, the solution of wax would penetrate between the plates, and probably come in contact with the matter itself.

By the method above mentioned, the vaccine virus is preserved on the cotton, *fluid*, so that inoculations may be made with it without any previous dilution with water; all that is necessary being only to press the cotton with any hard substance, and then to dip the lancet in the matter where the cotton appears moist. This method, they observe, has commonly succeeded with them; though they acknowledge to have received frequent accounts from their correspondents of its failure, which they appear willing to attribute to some inaccuracy in the sealing of the plates, or to the cotton not being sufficiently impregnated with the matter, &c.

They tried the use of *amadou** instead of cotton, but without success; probably, as they observe, owing to its being prepared with urine or saltpetre.

Another method of inoculation which is mentioned, and which rarely fails, is to make three or four punctures on the arm of the patient, so that the blood just appears; then to lay over them a small compress previously soaked in vaccine matter, and, if dry, moistened again with the breath or saliva. This is to be confined with adhesive plaster, or a bandage, till the punctures shew the signs of having received the infection.

This method certainly appears very efficacious; but we may observe, that it is very wasteful of the virus, and therefore impracticable where a number of persons are to be inoculated from a very small stock of matter.

The authors employ no medicine in vaccine inoculation, none having been found necessary; but in the subsequent vaccine eruption they give small doses of calomel.

A number of instructive cases are to be found in this volume, particularly of *imperfect vaccine inoculation*, in which the patients were *not* rendered secure from variolous contagion; of *vaccine inoculation where the infection of small-pox had been*

* *Amadou* is a fungus of the larch and other trees, which, when well beaten, and soaked in urine, or especially a solution of nitre, is much used instead of tinder; for which purpose it answers admirably. It is much employed in France and Italy.

already

already received, producing a mixture of the two diseases, and a want of the inflamed circle round the puncture for vaccine inoculation; and of *subsequent vaccine eruption*, which, in some cases, was pretty severe. We shall only give a case of the latter, as it is interesting, and affords much matter for speculation.

"The 1st of June 1800, we inoculated with the cow-pox the daughter of the Baron de S. aged fifteen months.

"From the 2d to the 8th, the usual appearances of successful inoculation came on successively.

"9th. The child was restless in the night, and the inoculated pustules appeared full of lymph.

"10th. Still restless, but no inflamed areola appeared round the pustule.

"11th. From the afternoon to the evening the child had a little fever. *The circular inflammation was now an inch and a half in diameter.* The face pale.

"12th. Less restless in the night. A slight subsequent vaccine eruption appeared. The inoculated pustules were yellow.

"13th. Quiet in the night, and cheerful in the morning. The inflamed circle surrounding the inoculated parts had nearly disappeared, and these latter were covered with a scab. Five subsequent pustules now appeared on the body, and two on the face.

"14th. Four more pustules came out.

"15th. The child very cheerful. Several large fresh pustules of a lively red now appeared.

"16th. Somewhat restless in the night. The pustules were rather larger than usual, red on their outer circumference, and the greater number contained purulent matter at their edges. They resembled much the small-pox, but were less. In the evening, the quantity of matter which they contained was increased. Nine pustules were counted on the face. The child was disturbed.

"17th. All the pustules of the subsequent vaccine eruption were quite filled with purulent matter. Forty were counted on the body. The child was very cross, perhaps because there were some pustules on the tip of the tongue and under-lip, which are very tender parts.

"18th. The child was very cheerful. The eruption on the face began to dry up.

"19th. The eruption almost entirely dried up on the face;

 some

some on the body still purulent. Quiet in the night. Cheerful, and a good appetite. The face still pale.

"20th. The eruption on the face quite dry, scarcely leaving a few crusts. The pustules on the body still covered with a small thin yellowish scab.

"22d. The eruption on every part, on subsiding, left very hard knots."

In a letter from M. Ziegler at Halberstadt, it is mentioned, that in inoculating six children, of whom three had lately had the hooping-cough, these latter did not take the infection at first, but required a second inoculation for the purpose; and this Mr. Z. makes a general observation in all the cases which fell under his care. Mr. Z. appears to have met with the same subsequent vaccine eruption; but he observes, that "the greater number of children inoculated with success had, a day after the fever left them, a frequent, watery, and offensive diarrhœa, sometimes attended with some discharge of blood: and these patients had not the subsequent eruption." He further remarks, that "all the children who had been inoculated with success were then in very good health, with much colour in their cheeks, even those who were before weak and sickly. Those who were in the best health were the patients who had had the diarrhœa after the vaccine fever."

A fatal case is related, in which the small-pox infection appeared with great malignity towards the latter end of the progress of the vaccine inoculation, which last, however, had always wanted the inflamed circle; yet another patient was inoculated from the vaccine pustule on the ninth day, who had the cow-pox regularly, and with complete success.

We have now selected from this valuable work whatever appeared to us important or interesting to our readers, and we are happy to find that the progress of the vaccine inoculation in that part of Germany is committed to such able hands. The work contains two very illustrative coloured plates; the one, taken on the spot, exhibiting the progress of the regular vaccine pustule, drawn both in face and in profile; the other, a copy of an excellent comparative view of the different periods of the small-pox and cow-pox inoculated pustule, taken from a pamphlet published not long ago in this country.

ART.

ART. XI. *Le Medecin-naturaliste; ou Observations de Medecine et d'Histoire naturelle.* By J. E. GILBERT. i. e. *The Physician-naturalist; or Observations on Medicine and Natural History.* Duodecimo. 340 pages. Lyons. 2½ livres.

THE estimable author of this work, already known by many interesting productions, and by the good which he has done in his country, has judged proper to make known the principles of *Sydenham, Morton,* and *Chirac,* by giving an account of their lives and writings. This part is followed by an historical account of the disorders that prevailed at Lyons in the last six months of 1797; of those which predominated during the winter and the spring of 1798; and concludes with some clinical annotations for the years 1784 and 1785. He afterwards treats particularly of inflammations; of eruptive fevers; of evacuatory and convulsive disorders; of pains, cachexies, and imperfections. He gives many observations on natural history and botany: the last particularly, relative to plants observed in the neighbourhood of Lyons, form an appendix to the memoirs of medicine. The work concludes with observations on *zoology* and *mineralogy* sufficiently interesting to be noticed: these are, for the first of these sciences, 1. Observations on the Elk of Lithuania; 2. On the Castor and its Habitations; 3. On the genital Parts of the Tortoise, and of the Heath-cock. In mineralogy, a memoir on the physical geography of the grand dutchy of Lithuania, and its climate. The author has added at the end, the *Enumeratio methodica Graminum Tractus Lugdunæi* of Lafourate.

[*Journ. Gen. de le Lit. Franç.*

ART. XII. *Beitrage für die Zergliederungskunst:* i. e. *Anatomical Memoirs.* Published by H. F. ISENFLAMM and J. S. ROSENMULLER. Tom. I. N^os 1, 2, and 3. Octavo. With plates. Leipsic.

THIS collection presents a great number of instructive memoirs, for the anatomist in particular, and for medicine in general. We shall only mention some of them, to give an idea of the importance and of the utility of the undertaking.—1. Fragments on the History of the Teeth, by *Schreger*—2. Some remarkable Differences between the right and left Sides, by *Isenflamm*—3. On a deformed Infant, by *Wiedemann*

 —4.

—4. On the Obstruction of the Ductus thoracicus, by *Ashley Cooper*—5. Dissection of the Sepia, by *Tilesius*—6. On the Brain and its nervous System, by the same Author—7. Organization of the anatomical Institute at Würzbourg, by *Siebold* —8. An Account of the anatomical Theatre at Leipsic, by *Rosenmuller*—9. Observations on the Tendons, by *Isenflamm* —10. Description of a Deformity in a Child's Head, by *Loschge*—11. State of anatomical Knowledge in Portugal, by *Tilesius*—12. Observations on the Organs of the Voice in Birds. [*Journ. de la Lit. Etrang.*

MEDICAL INTELLIGENCE.

Art. 13. *Examination of the colouring Part of the Blood, by Fourcroy and Vauquelin.*

THE colour of the blood seems, in a great measure, to be owing to the iron which was first discovered in this fluid by Menghini; but in what state it existed there, had hitherto been left uncertain. Deyeux and Parmentier thought the iron to be combined in the blood with natron, in a state analogous to the tinctura alkalina. Sage and Gren imagined that it might be united with phosphoric acid; a conjecture, the truth of which is at present confirmed by the late experiments of those two great chemists, Fourcroy and Vauquelin; the results of which are the following.

The red part of the blood, precipitated from the water with which the crassamentum had been washed, being burned in a crucible, a residuum of a dark red colour remained, which contained iron, and amounted to about 0,0045 of the blood employed in the examination. For separating the iron, or its natural combination, from the adherent salts and other heterogeneous particles, the above residuum is digested in diluted nitric acid, in which a part of it dissolves, while another remains undissolved, and obtains a high red colour. Ammonia occasions in this solution a precipitation of phosphat of kali. Muriatic acid may be likewise employed for dissolving the phosphat of iron, that remains after having heated the above residuum. The phosphat of iron appears in a double state, according to the degree of its oxydation, in the first of which it is of a grayish colour, of a glossy surface, not soluble in water, but soluble

ble in acids; whereas in the other state it is red or brown, and less soluble in acids than in water; in the first state the phosphoric acid is exactly saturated with iron, while in the other case it is supersaturated with the oxyd of iron. Caustic alkalis do not entirely decompose the white phosphat of iron, but only deprive it of a part of the acid, leaving the phosphat of iron in a state of supersaturation; in which it exists in the blood, dissolved by the serum: and the blood of all animals is coloured by the phosphat of iron supersaturated with oxyd. In this state it dissolves easily in the white of an egg and in serum, when it is shaken with these fluids, by which a red solution will be obtained similar to blood. The presence of natron in the blood contributes greatly to produce that state of the phosphat of iron, and at the same time heightens the colour of it.

It is a characteristic property of the red serum, that its colour is changed by the contact with air, as it becomes light red in oxygen gas, and dark red or brown in carbonic, but particularly in hydro-carbonic gas. It likewise acts on the atmosphere by imbibing its oxygen, and forming carbonic acid.

All these phenomena seem undoubtedly to depend on the phosphat of iron, because they manifest themselves particularly when it is united with the serum.

It is observed by Vauquelin, that the colouring part of the blood dissolves copper with great ease, because the residuum of the serum sanguinis, which had been boiled in a clean vessel of copper, in order to coagulate the albuminous particles, shewed evident traces of its containing copper. On precipitating its solution in muriatic acid by ammonia, the liquor received a beautiful blue colour, which disappeared again on adding more muriatic acid. An iron plate put into the solution was immediately covered with copper particles. Mr. Vauquelin, however, is of opinion, that this solution of copper proceeds particularly from the albuminous matter, as the liquor obtained by washing the crassamentum sanguinis with water did not dissolve copper when previously freed from the albuminous particles. We ought, therefore, to take care not to boil blood which is intended for food in copper vessels. The liquor obtained by washing the crassamentum sanguinis consists, accordingly, of much water, albuminous and gelatinous substance, and phosphat of iron, which, being dissolved in the albuminous matter, is precipitated with it, as soon as it coagulates. The albuminous matter however, notwithstanding its combination with the phosphat of iron, acts on the copper,

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and probably also on other metals. The above liquor contains likewise natron and some other salts. The co-existence of the phosphat of iron and of natron is not at all surprising, when we consider that fixed alkalis do not entirely decompose the phosphat of iron, but change it into a phosphat with superabundance of oxyd, in which state it exists in the blood. It is likewise known, that iron is oxydated in a solution of phosphat of natron, and by decomposing this salt for the most part becomes a phosphat of iron. It is probable that this substance is formed in that manner in the blood, whereby, at the same time, the natron is disengaged.

Art. 14. *Berthollet on the muriatic Acid.*

Cit. Berthollet has at length published his experiments on the muriatic acid, of which the following are the results: 1. Potash and metals are capable of transforming the nitric acid into muriatic acid. 2. The radical of the muriatic acid is to be sought for in the water, and nitric acid, that is to say, in the oxygen, azote, and hydrogen. 3. It is probable that in the muriatic acid, the azote, as the basis, is united with a portion of oxygen and hydrogen.

Art. 15. *Analysis of the Ear-wax.*

Fourcroy and Vauquelin have analysed the ear-wax, and found it to consist of the following substances: 1. An oily matter, more resembling the fat which is contained in the gall, than any other animal fat. 2. Of an albuminous animal substance. 3. Of a colouring principle, which by its bitter taste, and close combination with fat, comes very near to the colouring principle of the bile.

Art. 16. *Facts and Discoveries respecting Galvanism.*

In a letter from Berlin, inserted in the Magazine Encyclopedique, l. 1801, p. 110, several experiments are related by Helvige, a Swedish major, Bourguet, professor of chemistry, Hermann, professor of natural philosophy, and Dr. Grapengiesser. These philosophers repeated the experiment made by Volta, as well as those made in England. Their pile consisted of gold and zinc, with cloth moistened with salt water. Other metals, particularly silver and copper, were used instead of the gold, without affording any determinate ground for the prefer-

ence,

ence, that appeared to these operators. They found that the galvanic spark is obtained with much greater facility, when one of the two conductors terminates in very fine pointed iron wire, and the other in a knob, or button. This was discovered when Bennet's gold leaf electrometer was made part of the circuit: and since making that observation, they constantly armed the extremities of their conductors with gold leaf: by which means they obtained a strong spark with ease: they used the same method with the greatest success in setting fire to phosphorus, sublimed sulphur, fulminating gas, and gunpowder; the last of which is not easily fired by the common electrical machine. It was remarked, that in those experiments, the portion of gold leaf which covered the extremity of the conductors, was itself fused, and reduced into a globule more or less perfect, according to the force of the spark. They repeated Mr. Nicholson's experiment with the condenser, with the same result: the silver end of the pile being negative, but the zinc end positive. They could not obtain a shock by charging a Leyden vial; but they produced the configurations of Lichtenberg and Bennet upon a resinous plate with the same varieties and forms which would have been produced by the electric fluid.

Dr. Grapengeisser has applied the galvanic energy in medical cases, and observes, that the similitude of this action, and that of the electric fluid, cannot be mistaken.

Mr. Cruickshank observes, that the brush and flash always appear at the extremity of the wire connected with the silver, while that connected with the zinc exhibits only a faint luminous point. These circumstances induced him to suspect that some mistake had been made in Mr. Nicholson's experiments above alluded to. Mr. Nicholson, however, intends to repeat the experiments, that the facts may clear up this matter, and shew whether there be any striking difference between the galvanic and electric lights.

We have already noticed some experiments made by Cit. Halle, which were repeated several successive days at the School of Medicine at Paais, and the results afterwards communicated to the National Institute. In the application of galvanism to the human body, Cit. Halle observed some very singular anomalies. The pile was often very long before it produced its effect; sometimes its power ceased for several seconds together. In both these cases it seemed as if the fluid met with some obstacle in its course; for in these circumstances it was necessary to moisten the skin, to rub it, and

change

change the relative position of the rings, in order to make the communication. In general it was observed, that, in order that the sensation should be speedy, it was not enough that the skin should be wetted; but that it must be, as it were, soaked and softened with water. He himself, as well as several other persons, made trial of the sensation produced by galvanism, which they compared to that of the action of several needles forced at the same time into the skin. It is a pungent pain, accompanied with a sense of heat, and a slight metallic taste, when the excitors were placed near the salivary glands.

Art. 17. *Society of Medicine at Bourdeaux.*

The Society of Medicine at Bourdeaux proposes a prize, of the value of 300 francs, to the person who shall draw up with order, regularity, and method, a view of the doctrines of Hippocrates, or a table of Hippocratic medicine. This prize will be distributed at the public sitting of Fructidor, 10th year, (August 1802.) Memoirs, post paid, will be received till the 1st of Thermidor (July) of the same year, by the general secretary of the Society.

THE

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Art. I. *Observations on the Marsh remittent Fever, more particularly in regard to its Appearance and Return every Autumn, after the Inundation from the Sea on the 1st of January* 1795, *and the five succeeding Years, at Lynn and its Environs. Also on the Water Canker, or Cancer aquaticus of Vanswieten; with some Remarks on the Leprosy.* By the late Robert Hamilton, M. D. of King's Lynn, Fellow of the Royal College, and F.R.S. Edinburgh; honorary F. R. Phys. S. Edinburgh, and C. M. S. London; Author of a Treatise on Scrofula, and other medical Tracts: with Memoirs of the Author's Life. Octavo. 171 pages. Mawman, London. 1801. Price 4*s*.

Dr. Robert Hamilton, after having been a naval surgeon for some years, received a diploma from the university of St. Andrew's, and became a physician at the town of Lynn Regis in Norfolk. Here he practised with skill and success from the year 1766 until 1793, and wrote various philosophical and medical treatises; those forming the subjects of the present publication have been selected from a large collection of manuscripts, which, if what are now submitted to the public should be favourably received, we are informed, will be successively committed to the press. Much has been already written on the subject of remittent fever by those who have observed its phenomena in various parts of the world, but the result of attentive investigation and long practice must always be

be productive of useful information, if it even tend only to confirm the experience and opinions of others, or to form a ground for comparing the effects of one local source of disease with those of another.

"The remittent fever, or the marsh remittent, commonly called the *autumnal bilious* fever," says our author, "is endemial to all the marshy and fenny situations around Lynn; it appears more or less every autumn, and is more or less epidemic in the autumnal months, according as the preceding summer has been dry or wet. If a very wet winter and spring are succeeded by a very hot and dry summer, in which the ditches and marshes are nearly dried up, it is very generally epidemical, and spreads widely around us. It most commonly appears about the middle of August, and lasts till the ditches are filled with water, the marshes somewhat covered, which, with a frost, usually puts a period to its raging in that form, for that season; for it now generally changes to the type of a genuine intermittent. This is its common mode of termination, as the winter advances; but when it rages with extensive violence, during the autumnal months, it puts on a variety of morbid degeneracies, many of which, by persons unaccustomed to its Proteus-like changes of type, would be taken for a very different disease.

"From many years observations on this disease, and by attentively comparing those with what had been written on this subject by the best modern authors, it appears to be the same distemper with the bilious remitting fever of the Netherlands, the tertiana of Minorca, which I had seen part of three seasons on that island, the remitting fever of Bengal, the yellow fever (as it is called) of the West Indies, the bilious remittent of Senegal, and indeed the same disease every where, in the neighbourhood of low, swampy, or marshy grounds, which are subject to be overflowed by the freshes after great rains, or to be covered occasionally by inundations from the sea; but is more generally universal and destructive in such situations between the tropics. This must appear evident from its originating in every country from the same cause—the subtile miasmata, or putrid effluvia, emitted from the highly putrid stagnant water; but more especially from the corrupted animal and vegetable matters with which those waters are loaded, and which are left on, or mixed with the ooze or mud, at the sides and bottom of the overflowed swamps and ditches, as these become gradually uncovered, in the process of evaporation, and more corrupted, and the effluvia from them

them exalted, by the intense heat of the sun: and these fevers in this country differ only in malignity and fatality from those of hot countries in proportion to the difference of the climate. It has been found, however, in some particular seasons, in the neighbourhood of Lynn, more especially when a very hot and dry summer succeeded an inundation from the sea, to come near in violence and malignity to its appearance in many places between the tropics."

Lynn is surrounded, for many miles, by low, marshy land; that on the west side of the haven is distinguished, by way of eminence, by the name of Marshland, or, as it is pronounced by the inhabitants, *Mersland*, and contains seven parishes, with much rich land, and a great deal of fen land, overflowed and uncultivated. Beyond it is an immense tract of country, included between the S.S.W. and N.W. points of the compass, comprehending the low fenny lands of Norfolk, Suffolk, the isle of Ely, Northamptonshire, Huntingdonshire, and Lincolnshire. Those lands which have been drained are prevented from being overflowed by artificial embankments, which, however, near the sea, are subject to be broken by the impelling force of high tides, accompanied with high winds, and those in the inland parts of the country are liable to breaches from the weight of water after heavy rains. The vicinity of the town of Lynn is, therefore, from both these causes, liable to dreadful inundations; those occasioned by the sea, if they extend far, cover much low ground under cultivation, and fill innumerable ditches, which, in several situations, cannot be drained by any other means than evaporation by the heat of the sun. Dead fish left upon the overflowed land become putrid, and both animal and vegetable life is destroyed by the salt water in its inroads upon cultivation.

The author, in comparing the prevalence and malignity of the remittent fever in certain years, with the extent of the occurrences just mentioned in the same years, found so striking a correspondence, that he was satisfied of the disease being caused by what is commonly called *marsh miasma*. We extract the following account of the symptoms of this fever, viz.

"In the autumnal months of those five years which succeeded the inundation from the sea, on the 1st of January 1779, that is, of 1779, 1780, 1781, 1782, 1783, this disease, as has been already noticed, was more violent, universally epidemic, and more fatal, than in any period within my remembrance since I have resided in this town, which is now

 forty

forty years. And the following description of it is confined chiefly to its appearance during those great epidemic seasons.

"The attack of this distemper was marked by a chilness, sometimes by a shivering like the cold stage of an intermittent; and this rigor was of different degrees of violence and duration in different subjects, and often accompanied with wandering spasmodic pains in the back and extremities. This was succeeded by an intense burning heat in the trunk of the body, particularly about the gastric region and the hypochondria, without any remarkable thirst, whilst at the same time the extremities were cold to the touch and feeling of the patient; the head ached violently, the pulse was low, irregular, and very quick; and the whole was accompanied with anxiety, and great, indeed most extraordinary, prostration of strength. This was generally attended with a vomiting of viscid matter, acid, offensive to the smell, and mixed with bile, either yellow or green, often of a very dark green colour, approaching to black; and sometimes the matter thus ejected was black. There was most commonly a most profuse purging also, of the same kind, exceedingly fetid, and so acrid as to excoriate the parts about the anus: in short, these two discharges constituted a symptomatic cholera morbus.

"Those symptoms continued with great violence for twelve or fourteen hours before any remission took place, when a gentle sweat broke out, the fever abated, and the vomiting and purging lessened, or entirely ceased, as the sweating increased; but this remission was but of short duration, perhaps three or four hours, when the chilness and exacerbation of fever recurred with additional violence, and the same train of subsequent symptoms. The tongue had a most singular appearance, and indeed was so characteristic of the disease, that the bare inspection of it was sufficient to distinguish its existence. It was at first moist, with a thin white mucous covering, which in a few days became gradually thicker, forming a coat much resembling thin wet leather stretched over it; and as the disease advanced some twelve or more days, it turned brown in the middle, and in many black, in the last stage of the distemper, but never very dry and parched.

"If this disease was neglected in the beginning, which was often the case, on the supposition of its being a common intermittent, and suffered to go on without any medical help, or indeed if it was mismanaged; if the patient had the good fortune

fortune to escape being carried off by the violence of the symptomatic cholera, the remissions became shorter in duration every return; the vomiting and purging abated, or nearly ceased, a sweat appeared in the place of them, often very profuse, without giving the smallest relief, but, on the contrary, contributed to sink the patient; the burning heat of the skin continued, the headach increased, a delirium came on, the remissions were scarcely to be distinguished, the pulse gradually became weaker, a stupor appeared with subsultus tendinum, or an universal spasm of the muscles, the patient sunk under the colliquative sweat, and died comatose.

"Although this is a genuine representation of the disease, as it appeared in all those years, it was marked with variety in the several epidemic seasons, perhaps from the different constitutions and habits of life of the patients; the situations of their houses, their diet, the greater or less quantity of the disease, or other causes which we were strangers to. Some had it but slightly, and it soon terminated the symptomatic cholera morbus, by discharging the putrid mucous saburra from the stomach and intestines, removed with it the adventitious miasmata, the true fomes morbi, and, with this, the disease entirely. This I have frequently seen on the first onset of this distemper, either on the first or second day. On the other hand, it must be acknowledged, that those discharges have been known to destroy the patient in forty-eight hours. Many have been carried off between the fifth and ninth days of the disease by the violence of the evacuations in this cholera, which recurred with redoubled fury on every exacerbation of the fever in that period, and the distemper in some of the intermediate days between the fifth and ninth seemed to have changed its type in some instances, and put on the form of a continued, putrid, malignant fever. This was most particularly so in 1782, 1783. In both these autumns, I saw some in the town, but more in the country, to whom I was called in at the close of the disease, where the putrefaction was so great, and the blood so much dissolved, that it passed unaltered with the secretions, through several of the emunctories: the urine, which at first was only tinged, looked at last to consist almost wholly of blood; the saliva was bloody; the discharges by vomiting and stool were mixed with blood. In short, blood seemed to have transuded into every cavity from the excreting capillary arteries. The hæmorrhages from the nose, (which did not appear to come from any one open vessel, but from the whole surface of Sneider's membrane,)

membrane,) contributed to sink the patient; and those patients retained their senses to the last.

"Many were covered with brown, red, or purple petechiæ, at the same time; and, if I may be allowed the expression, sunk under a truly gangrenous fever *. Some young people who had delirium, and a burning skin, had the nervous system seized with subsultus, or universal spasm, coma vigil, died raving mad; and some had petechiæ without hæmorrhage. More old people died than young, and those were highly putrid; the halitus from their breath was horribly offensive, and highly infectious. Their throats were crusted with aphthæ, their tongues covered with a brown, or black fur, and the teeth also; yet some with even these bad symptoms recovered. Very few recovered when the disease was so long protracted, after changing its type, till the delirium, subsultus, stupor, or a coma vigil, sunk pulse, colliquative sweats, &c. took place; in short, when the fomes morbi had attacked the nervous system few or none recovered.

"In most patients where the distemper was protracted to, or beyond the fourteenth day, when it had put on a more continued form, the patient had a most cadaverous look, and bloated countenance, with sometimes brown dirty-looking petechiæ spread all over him; and the bed and room had a fetid, offensive, cadaverous smell. Those patients were extremely infectious.

"Nosologists may allege that the above description may be applied to the typhus carcerum, synochus putris, &c. and that it was not one, but many fevers were epidemic in the different seasons herein mentioned. But, from the close attention to facts, at the bedside of the sick, for many years, and the most accurate investigation I was able to make, I think myself justified in asserting, that one specific fever, from one specific origin, was the disease, and that the varieties were

"* I visited a miller at Litcham, in October 1782, whose house stood on the common, in a low and very moist situation; he had been ill of this fever a week. I found him covered with purple spots; his spittle, urine, and stools were tinged with blood: he was perfectly sensible, and died two days after I saw him. His brother, who came after his death to take care of the business, caught the infection, and died in the same state. A master tanner at Lynn, a shopkeeper at Crinstone, and several more, died in the same way; and these were all attacked in the beginning with the reigning epidemic, the remittent fever; but I had not an opportunity of attending through the course of the disease in most of them, but only visited them once towards the close of it."

owing

owing to constitution, and other contingent circumstances, which will be noticed in the sequel."

Dr. H. examines and refutes the opinion, that the autumnal fever is occasioned by putrid bile, which, on the contrary, would seem to be rather the effect of that disease. The miasma, he conceives, finds its way into the stomach by mixing with the saliva; and if not either regurgitated by vomiting, or expelled by diarrhœa, is absorbed from the intestinal tube, and contaminates not only the contents and juices of that passage, but the circulating fluids themselves, and thus produces the disease in its worst varieties. Whether this idea of the influence of marsh miasma on the human constitution will stand the test of severe investigation, or whether the evening exacerbation of the fever can be properly ascribed to absorption of the poisonous *fomes* increased at that period, we shall not attempt to determine, but proceed to treat of a much more important point than pathological heresy, the most successful mode of *curing* this formidable distemper.

When medical assistance was called for early in the disease, an emetic, without delay, to be followed by some gentle purgative, was generally prescribed; and these objects seemed to be both most effectually promoted by the addition of magnesia vitriolata to emetic tartar: calomel was also often resorted to with advantage. James's antimonial powder was not found equally efficacious for securing a perfect evacuation of the stomach, with the tartarized antimony. After the intestinal canal was well emptied, an opiate proved very serviceable for quieting the commotions induced by either spontaneous or artificial discharges. About this period the patient was probably in a sweat, and under the remission of the fever; and, if so, the Peruvian bark was instantly exhibited, and with great freedom, a drachm or more of the powder being repeated every hour, if the stomach would bear it; and even if it rejected the two or three first doses, the patient was urged to persevere, and generally was rewarded for it by losing the disease. Ammonia, opium, in a small quantity, or the common effervescing draught, was sometimes joined with the bark, when the nausea proved obstinate. Wine, fruits, and liquid diet of easy digestion, were liberally administered; and this plan, when strictly attended to, in conjunction with the other remedies, usually restored the patient to health in a few days.

"Far different was the lot of those whose abode was in the country, and distant from such medical help. In the country it was to be lamented that medical assistance was seldom

 thought

thought of at the first onset, and the disease had often gained too serious a footing in the patient's habit before help was called for, and therefore too late to put the necessary precautions for stopping the progress of the disease in execution. If the patient employed a judicious and intelligent apothecary, many of whom are to be found in this town and neighbourhood, he was fortunate; for the physician in most cases seldom saw the patient above once, and that was generally at the close of the distemper, when but too often he could not be of the smallest service; and has frequently had the mortification to find the patient past recovery, and even in articulo mortis, on his first visit. This is the most distressing part of a country physician's practice; he never has it in his power to conduct a patient through a disease, who is situated at a distance from him. The country people, in general, think it sufficient if the physician sees the patient but once during his illness, and sit down satisfied that they have done their duty, or, as the common phrase is, have done all they can. The absurdity of this conduct is too obvious to need any comment."

The above remark is too applicable in the greater number of diseases to which the physician is called, and which he is expected to cure. In the disease now under consideration, if it was in any instance too long neglected, delirium, coma, *subsultus tendinum*, and sinking powers, were rarely to be successfully opposed by blisters, camphor, musk, or the most liberal use of bark and cordials. In those cases which were attended by a dryness of the skin, emetic tartar, joined with the bark, seemed productive of much benefit; but it required judgment in the exhibition; for, as the patients often sweated spontaneously in a most profuse manner without advantage, an artificial increase of diaphoresis would often contribute to sink them, and accelerate the fatal catastrophe. When, among other varieties of type, this disease had taken on what is called the putrid form, and petechiæ, hæmorrhagies, and a gangrenous tendency appeared, opium and Peruvian bark were most copiously employed, with infusum rosarum and wine for common drink, vinegar whey, vegetable and mineral acids, fixed air, &c. A bath of bark, the same substance by way of partial fomentation, shirts and jackets impregnated with it, and even cataplasms, appeared to the author deserving of trial. The intermittent form generally took place at the end of autumn and beginning of winter, but it did not require a treatment distinct from what was used in the ordinary remittent type.

We

We have now presented our readers with an analysis of Dr. Hamilton's Treatise on remittent Fever; and we thought it necessary to be thus dilated, on account of the great importance of the subject, as well as for the sake of doing justice to the work itself We proceed to extract the same author's description of the symptoms of a disease much less generally known, but of a much more alarming and dreadful nature,—the *Water-canker*.

"I know of no name in the English language, by which the terrible distemper which is the subject of the following paper is to be distinguished, and therefore have adopted that of the Water-canker, or Cancer aquaticus, from the illustrious Baron Vanswieten. It is indeed called a cancer in the mouth by the common people in this town and neighbourhood; a very improper appellation, as it confounds this disease with the real cancer, to which it bears little if any resemblance.

"From its frequent appearance in Lynn and its environs, the low watery situation of which has been described in the paper on the Marsh remittent Fever, the water-canker appears to be an endemic disease of a low, moist, fenny, or marshy country, as it is unknown in high and dry situations, even within twelve or fourteen miles distance from this town. My late worthy friend Mr. Bewly of Massingham, (a name well known in the philosophic world,) which is about the distance, never saw a single case of this disease in more than thirty years practice.

"The first symptom of the approach of the water-canker is an inflammation without any swelling, of a remarkable bright pale red colour, on the sharp edge of the gums next the teeth, sometimes in the upper, sometimes in the lower jaw, very rarely in both at the same time. It is most commonly before, at the bottoms of the dentes incisivi, but sometimes it appears on the sides at the molares. This inflammation generally extends along five or more teeth, and the colour of it is so remarkable, that it is readily known and distinguished from common inflammation, and its consequences dreaded by people conversant with the distemper. The inflamed edge of the gums soon becomes ulcerated, in nearly a straight line, as far as the inflammation reaches, as if the edge had been cut off by a sharp instrument. The same kind of inflammation continues on the outer edge of the ulceration; and within that, towards the teeth, there is either a white or an ash-coloured slough extending from one end to the other, which is a real gangrenous eschar. The breath begins to be very offensive, and a discharge of a very

 fetid

fetid ichor mixed with saliva flows plentifully from the mouth. The ulcer spreads daily, the gums being gradually eaten as it were away by the corrosive ichor. The discharge increases and becomes more offensive, and the eschar becomes deeper, and is frequently coming away, and is succeeded by a fresh one. The ulcer bleeds on the slightest touch, and small coagula forming are detained on different parts of the surface, covering and disguising the slough. Thus does the disease continue its ravages until the gums are destroyed completely, and extending to the lining of the mouth, the neighbouring soft parts are involved in the destruction. The teeth now drop out; and happy is it for the patient if the depredation stops here, as their loss, if the patient is very young, may be supplied; but this is not often the case; for the secondary teeth next fall victims to its virulence, and with them the alveolar processes. Even cruel as this evil is, it would here be comparatively tolerable, could a stop be now put to the ravages of this rapacious enemy, which is very seldom to be effected: for now begins a scene shocking to humanity.

"The disease seeming to have acquired force in proportion to the extension of the ulcer, and the destruction it has occasioned, the fetor becomes intolerable; the discharge, then glazy and caustic to the highest degree, is prodigious in quantity, and corrodes wherever it falls. The bones, now a prey to the distemper, are as readily destroyed, indeed really dissolved, (no vestige of the softer ones remaining,) as the soft parts; and the destruction daily goes on, exhibiting a most shocking spectacle, until death happily puts a period to the pains, and existence at the same time, of the miserable patient, which generally happens in a few days after the bones are affected."

The rapid progress which this distemper makes after it has reached the bones, will appear from the following case, viz.

"A child about two years old, the daughter of John Costin, a labourer, who attended the works which supply the inhabitants of this town with water, and whose habitation was upon the banks of the reservoir, was brought to me in May 1754, afflicted with the water-canker, and was the first instance I had ever seen of the disease. The gums of the upper jaw had been ulcerated some days, and were almost destroyed. The rapidity of its progress astonished me; for in two days from the time I saw it, the corrosive ichor had eaten through part of the lip under the nose; in two days more the lip was entirely gone. The nose and cheeks fell next a prey to its fury; the whole ossa maxillaria were destroyed; and the child ended her days in something more than a week from my first seeing her, a most shocking spectacle."

There

There seems to be but little reason for supposing the water-canker to be contagious, or even epidemical; but few years pass without the appearance of this horrid disease in the town and vicinity of Lynn. It was observed to be most malignant and fatal in warm weather succeeding a rainy season.

"In the cure of this distemper," says the author, "I have found the external application recommended by Vanswieten, in which spt. salis marini is the chief ingredient, the most successful. The ulcer is to be touched lightly with a hair pencil armed with a mixture of mel rosar. and the spirit of sea salt, increasing the proportion of the spirit according to the acrimony of the discharge, and the degree of destruction which the parts have suffered. The illustrious Baron even applied spiritus salis marini without any mixture in the worst cases with the best success; and tells us, that it immediately stops the progress of the gangrene, and in a short time the gangrenous eschar separates from the living parts, and never fails if the bone is unaffected; but confesses he never could stop the caries, when that was the case. The strongest I ever used was equal parts mel. ros. and spirit. sal. mar. The mouth is to be frequently washed with a gargarism of barley-water, mel. ros. and spt. sal. mar. or tinct. rosar. and spt. sal. mar.; and if the ulcers are far advanced, with decoction cort. Peruv. mel. ros. and spt. sal. mar. The gargles are to be used before the other application, and this is always best after any food or drink has been given to the patient, for very obvious reasons, who should be encouraged not to swallow the spittle. As it may be difficult, if not impossible, for a child of a tender age to be taught to wash its mouth so effectually as the nature of the disorder may require, the ablution should be performed by a dexterous assistant with a syringe, which indeed will be found always the best method in an advanced period of the distemper; and lint dipt in the other application should be laid to the ulcers when this is the case, as it must soon be washed off by the discharge, when only laid on by a pencil. The Baron in slight cases also advises the mouth to be washed with a solution of sal ammoniac, or nitre in water, with the addition of a little vinegar, or citron juice, but this I never used; for when called early in this disease, I have been induced to apply a liniment of calomel and mel rosar. from the efficacy of this application to little ulcers called cankers in the mouth, which I shall afterwards mention, and to which I thought the beginning ulcers in the water-canker bore much resemblance; and have seen great advantage

vantage from its use, but never trusted it when the corrosion was advanced so far as to have almost reached the bone.

"The internal medicines which I have found most effectual, are such as generally take place in putrid fevers; all the usual antiseptics, with vegetable and mineral acids; but above all, the cortex Peruvianus. This medicine is given in the most commodious way the young patient can take it; in decoction it is to be acidulated with vegetable or mineral acids. Of the last I generally used spiritus salis marini, and sweetened it with manna or syr. rosar. solut. to keep the belly soluble, but if that is not wanted, with sugar, or simple syrup or honey: this is directed to be taken ad libitum, even as common drink, as too much of this invaluable medicine cannot be conveyed into the stomach. If enough of the bark, in decoction, powder, or extract, cannot be taken by the mouth to answer any beneficial purpose, which but too often proves to be the case, I generally direct from ℥ß, to ℥j, of the powder, according to the violence of the disease and age of the patient, to be divided properly, suspended in a sufficient quantity of water, or, what is better, decoction of bark, and thrown up by way of clyster in twenty-four hours, and continued through the course of the disease. The diet should be of the subacid, demulcent, antiseptic kind, adding occasionally a few drops of laud. to prevent its coming away too soon. The quantity of liquid should be small, for fear of stimulating the intestine, and thereby promoting its rejection before it can be of any use. The powder is preferable to any preparation of bark, because it will subside from the liquid vehicle in a little time, and remain engaged in the folds of the villous coat of the intestine; and it is not uncommon for four or five successive clysters to remain, without any part of them coming away, with manifest advantage to the patient. A gentle eccoprotic, however, will obviously be sometimes necessary to empty the intestinal canal. By these means I have seen alterations which astonished me in a very short time; the destruction of the parts has stopped, and the fever has not only abated, but ceased; the ulcers have become clean and disposed to heal; and the exfoliation of the carious bones in the two instances before mentioned followed."

The symptoms diagnostic of water-canker are sufficiently marked, and their difference from those attendant on scorbutus is very strongly insisted on: the author allows, however, that these two diseases agree in one particular circumstance, viz. that excessive moisture under different influences seems to be the primary predisposing cause.

On

On the whole, we consider these Treatises as highly creditable to the memory of their author, and as a valuable addition to the general stock of medical knowledge.

ART. II. *The medical Assistant; or, Jamaica Practice of Physic: designed chiefly for the Use of Families and Plantations.* By THOMAS DANCER, M.D. late Physician to the Bath, and Island Botanist. Quarto. 384 pages. MURRAY and HIGHLEY, London. 1801. Price 1*l.* 1*s.* in boards.

THE extreme mortality of many of the tropical diseases, the peculiarity of their symptoms, and the existence of disorders absolutely unknown in colder climates, must necessarily render a work, such as that now under consideration, peculiarly valuable. Before we proceed to an examination of the merits of Dr. Dancer's publication, it will be proper to state what he proposes as the object of the work. He informs us in the preface, that he "is persuaded to believe, from the approbation it has met with from those whom he thinks qualified to decide on its merits, that it will be found an useful one, not only in the hands of those for whom it was primarily intended; *viz.* those who have families, or who are entrusted with the charge of negroes, and who are frequently at a loss for medical assistance; but, in some measure also, to medical men; at least to such as are newly arrived in the island, and to those engaged in country practice; who have, in some situations, but little access to books, and less opportunities for reading."

The work very properly commences with an introduction, which contains a brief view of the animal economy, an account of the different temperaments, of the effects produced by the varieties of sex, age, habit, and climate, and of those circumstances which, in medical language, have been usually termed the non-naturals. Each of these subjects is treated in a manner necessarily concise, but upon the whole perspicuous, and sufficiently accurate. We shall present the reader with some specimens of this part of the work: the following is the account which the author gives "of the Lungs and of Respiration:

"We have seen that the circulation is a twofold one: 1st, Between the two sides of the heart, or from the right side, through the lungs, to the left side. 2dly, From the left side, over the whole system, to return to the right side. The use of the

latter has been explained;—we must consider now, for what purpose the chyle and returning blood are first circulated through the lungs. These are two large lobes, one on each side of the thorax, of a membranous cellular structure, to admit of inflation or distention by the air, in breathing, or respiration. The air, in inspiration, passes from the trachea, or windpipe, through all its numerous divisions, or branches, called bronchiæ, to the cells, or vesicles, which are thereby distended. By expiration it is, in a few seconds, expelled from thence.

"This alternate action of breathing, called respiration, we know is essential to life, no animal being able to exist many minutes without air; but the real use of this was never understood till of late, since the composition of the atmosphere has been made known by chemistry. The common air, or atmosphere, is found to consist of two kinds; one, pure or vital air, called oxygen, which is necessary to the life of animals; the other, by far the greatest part, noxious, named azote, because destructive. It was always conjectured that something was taken in from the air in breathing,—what that something is, is now fully demonstrated—it is oxygen, or pure air; which, mixing with the blood in its circulation through the lungs, changes its colour from a dark purple to a bright red. No air that does not contain a due portion of this oxygen, is suited to life. Mephitic air, inflammable air, and the several other kinds of air called gases, though they might serve for the expansion of the lungs, are all mortal to animals breathing them.

"The oxygen thus taken in, in respiration, has some intimate relation to the principle of life, for the degree of irritability appears to be always in proportion to the quantity of oxygen. It is on this likewise that animal heat depends—which is principally generated in the lungs. Respiration is subservient to several other uses of an inferior nature, which it is of little consequence here to take notice of."

Respecting climate, Dr. D. remarks, that its "influence upon the human body is very considerable, notwithstanding the extraordinary power it has of adapting itself to great alterations of temperature, or heat and cold. Cold has the uniform effect of condensing all bodies, and it thereby gives tone and strength; heat occasions relaxation and debility. This is obvious on viewing the inhabitants of different quarters of the globe, and the effects which a change of climate quickly produces. Persons passing from a northern latitude to the tropics soon experience the enervating effects of heat; and *vice versa*, the

the feeble and inert natives of the torrid zone, in going to a temperate one, attain a vigour and activity not inherent or natural to them. The diseases of cold climates are commonly such as arise from an excess of strength *; those of warm climates are generally occasioned by relaxation and debility. Inflammatory fevers, pleurisies, rheumatisms, &c. stand in the list of European complaints: among those of warm climates the principal are, bilious fevers, fluxes, tetanus, &c. A warm climate is propitious to tender infancy and extreme old age; children in the West Indies are, for the most part, very lusty and healthy till they are two or three years of age, when they grow thin and weakly: the complaints of old people are much mitigated by a warm climate, which compensates, in some degree, for its baneful influence on health in earlier years, if not by protracting life, yet by rendering old age comfortable. The inhabitants of warm climates are seldom subject to the hypochondriacal disease, or to depression of spirits. Consumptions sometimes occur, but rarely, in warm climates; and those labouring under consumption, by changing to a hot climate, obtain, if not a cure, a longer truce, or live for a greater length of time. The scrophula, likewise, which is supposed to be often the cause of consumptions, is hardly ever seen in warm climates, at least not in the West Indies."

We are next presented with a general view of diseases, their distinctions, symptoms, causes, &c. "Diseases are, 1st, local or general, internal or external—2d, of the fluids, or of the solids—3d, of the simple solids, or the vital solids; viz. the moving powers. They are either sporadic, affecting individuals only; endemic, affecting numbers at the same time; or epidemic, infectious and contagious, and general: further, they are hereditary, proceeding from parents, or arising out of some particular conformation or constitutional temperament, as gout, scrophula, consumption, &c. Again they are, acute or chronic, inflammatory, nervous, putrid, convulsive, spasmodic, &c. †

* "The typhus, however, is more a disease of cold climate than hot climate, because contagion, on which it depends, is dissipated by heat."

† "Men derive a particular disposition to certain diseases, from their trades, occupations, profession, and manner of life. The studious and sedentary are liable to one class of disorders—the labourer and mechanic to another. In this island, the persons most subject to be cut off by fevers and other acute complaints, are the mechanics, and medical men, who are more than any other description of people exposed to the inclemency of weather, night air, and fatigue."

"One

"One of the most important distinctions in diseases is, that of their being idiopathic; that is, primary or original, or sympathic, viz. symptomatic. It is well known that there is an universal consent between the several parts of the body, so that no one can suffer alone; but this consent is more observable in some organs than in others; the stomach, in particular, sympathizes with almost every other part, so that sickness and vomiting may be symptomatic, or arise from a great number of different causes, affecting different organs; *e. g.* from affections of the brain, as in vertigo; fractured skull; from affection of the kidnies, in the case of stone; from the repulsion of gout, &c. &c."

The observations upon the pulse appear to us judicious and important: "It is by the force, frequency, &c. of this (the pulse) that we judge of the action of the heart, and estimate the violence of the disease; but there is much difficulty in doing this. The pulse is so very different in different people, that to be able to make any proper judgment from it in illness, it is necessary to be acquainted in some degree with the natural standard of it. This may, in many cases, be guessed at from the make and constitution of patients. Tall and large men have commonly a slow but strong pulse: short people, one that is quicker: the pulse of women, children, and delicate persons, is either quick and weak, or slow and weak. The pulse differs in the same persons at different periods of life; in juvenile life it is stronger and quicker, in old age slower and weaker. The pulse varies at different times in the day; being slow in the morning, fuller at noon, and quicker in the evening. In some persons, the slightest indisposition affects the pulse considerably. The pulse likewise varies sometimes in different sides of the body *.

"From these circumstances, independent of many others which might be mentioned, the difficulty of judging from the pulse must be sufficiently apparent: it is however necessary to attend to it, as useful conclusions are to be sometimes drawn. The pulse, when stronger, harder, fuller, and quicker, than in health, shews increased action in the arterial system, and that the disease is of the inflammatory kind. A pulse more or less of this sort, is observed in the beginning of most fevers, in all local inflammatory affections, &c. and is considered as a

* "A person labouring under rheumatism, had a pulse in one arm only 50, whilst in the other it was 80. *See Zimmerman on Experience, vol.* i. *p.* 285."

proper

proper indication for bloodletting; but there are, however, certain exceptions.

"A pulse the contrary of the former, viz. a soft, slow, weak pulse, shews debility, or the want of due strength and excitement: this is occasioned by great discharges of any kind, or by long illness.

"A quick and weak pulse, of all others the most dangerous, shews great irritation, along with great debility. A soft pulse, though in general a mark of debility, attends some inflammations, viz. of the bowels, putrid sore throat, &c. An intermitting pulse shews irregular excitement, and is in general considered as an alarming symptom; but it is not always so: some persons are subject to it, and it is frequently observed in hysterical affections, in dropsy of the thorax, &c."

The fifth chapter of the introduction treats of "Remedies, their several kinds and operations."

In the section on bloodletting, we meet with the following note: "There is a very important observation to be made respecting the quantity of blood necessary to be drawn, viz. that the good or bad effects of bleeding are not in a ratio with the quantity taken; *e. g.* supposing a patient had experienced great relief in any complaint, from the loss of a large quantity of blood, as sixteen or twenty ounces, we are not thence to conclude, that he would have experienced a proportionate relief from a smaller quantity. Dr. Gordon says, that in the puerperal fever the taking away only eight ounces of blood always proved fatal, but bleeding to twenty or thirty ounces never failed to save the patient. Dr. Sydenham makes the same remark on bleeding in the plague. On the same principle Dr. Jackson bled in the fever at St. Domingo to thirty ounces: and Dr. Rush has strenuously defended this practice of bleeding copiously in the malignant or yellow fever of America."

Should future experience confirm the truth of this doctrine, we may perhaps, in some measure, be able to reconcile the differences which have subsisted among medical practitioners on the much-controverted subject of bloodletting. The articles of the materia medica are arranged according to their operation upon the body, and their different effects are briefly pointed out. The introduction then concludes with some observations on the effects of blisters, and the warm and cold bath.

The comparative view which is given of the effects of warm and cold bathing may deserve to be quoted, though perhaps

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not in every particular quite consonant to the prevailing doctrines upon the subject.

"*Effects of the cold Bath.*

"1. Abstersion of the skin.

"2. Abstraction of heat, therefore sedative.

"3. Condensation, therefore tonic: also, sending the blood from the surface to the internal parts, and so exciting the circulation.

"4. Horror, exciting contraction of the skin; which, by sympathy, is propagated over the whole system; hence tonic.

"*Effects of the hot Bath.*

"1. Abstersion of the skin.

"2. Increase of heat, therefore stimulant.

"3. Rarefaction, therefore relaxant: also, occasioning a freer circulation in the small extreme vessels; hence deobstruent.

"4. Soothing sensation, communicated by sympathy to the whole system; hence antispasmodic.

"From this comparative view of the effects of hot and cold bathing, the use of either may be understood. The cold bath is necessary, wherever there is a general loss of tone and vigour in the system; hence, it is proper to be used with weakly children, relaxed females, in some spasmodic complaints, in cases of general or local debility, after chronic rheumatisms, &c. It is improper in cases of a very full habit; in cases of diseased lungs, liver, &c.; and where there is great debility and emaciation, a certain degree of strength being required for the sake of re-action. It should be sudden and general, or else the head should be first immersed, otherwise it will occasion head-ach, and perhaps rupture of blood-vessels and apoplexy."

After this concise view of the introductory chapters, we follow our author into the main body of his work. He professes to rank the diseases not in a strictly scientific order, but "chiefly according to their importance, their connexion with each other, and the frequency of their occurrence." The first chapter embraces the interesting subject of fevers; these, he remarks, "are the disorders that carry off the greater part of mankind in all climates, more especially in hot ones; and fever is the attendant upon most other complaints." He divides the disease into the following different species.—Inflammatory, Nervous, Malignant, Yellow, Bilious, Remittent, and Intermittent. Were we to consider the various forms of fever with a view to their nosological arrangement merely, this division might become the subject of animadversion: in the present work, however, which professes chiefly to inculcate practical

 knowledge,

knowledge, the plan adopted by our author appears, upon the whole, preferable, of classing the varieties of the disease according to the obvious difference of their symptoms, without regard to their supposed origin; or the power which the contagion of any one species may, under peculiar circumstances, possess of generating a train of symptoms different from those attendant upon the original disease.

Every one knows that it was long a subject of controversy among medical writers, whether such a disease as the pure inflammatory fever exists, unattended with any local affection. The latest and most approved authors are agreed in denying its existence, at least in the temperate climate of Europe; and Dr. Dancer adds his testimony to the same effect with respect to the West Indies. "A fever purely inflammatory, beginning and ending as such, without any local complaint, or not terminating in symptoms of a different nature, if it be any where to be met with, I believe is rarely found in Jamaica:" but, he adds, "it may, notwithstanding, be useful to suppose such a fever; because, if it does not exist as a distinct disease, it is found in the beginning, or is an accompaniment of others." An account of its symptoms, and of the general plan of treatment, follow, which appear for the most part sufficiently accurate and judicious. We observe, however, one circumstance, which we think should not be permitted to pass without animadversion. Speaking of the treatment of inflammatory fever, the author recommends "washing or sponging the patient's forehead, temples, neck, and breast, with camphorated vinegar and water;" and he adds in a note, "Dr. Currie recommends the aspersion of cold water over the whole body." It appears, however, upon referring to the "Medical Reports," that it is to those fevers which assume the typhus type, that the practice of applying cold water to the body is limited; with respect to its use in the inflammatory fever, the celebrated author expressly says, "it is a subject of much difficulty, and my observations upon it must wait for the elucidations of future experience." He farther adds, "that he is induced to believe, that the sudden and temporary affusion of cold water, so advantageous in typhus, will not be salutary, or indeed safe, in inflammatory fever." Were we disposed to exercise the severity of criticism, we should also object to the term *aspersion*, which does not convey an accurate idea of the *cold affusion* as applied by Dr. Currie.

The following judicious remarks appear to us deserving of peculiar attention: "Changing the bed-chamber as soon as

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the patient can bear removal, serves greatly to revive his spirits, and thereby conduces, in all cases of fever, much towards recovery; but change of air, or place, contributes still more so. I think it, however, requisite to impress on the minds of persons the danger that attends moving convalescents prematurely; I have seen numbers fall martyrs to this imprudence: patients, after having been free of fever, and in a favourable state of recovery, by undergoing too much exertion and exposure in a debilitated state, have had a sudden relapse, and sunk immediately."

According to the division of febrile diseases adopted by Dr. Dancer, he next proceeds to treat of the low nervous fever, "called by physicians typhus," which, "though not frequent in Jamaica, in its pure form, or as it commonly occurs in colder climates, nevertheless shews itself in different shapes." Though we think it foreign to the present purpose to enter into any long nosological discussions, yet we cannot but object to the exclusive appropriation of the term typhus to the variety of fever treated of in this section. This appellation has been so generally extended by the most respectable authors, under the sanction of Dr. Cullen, to that variety of fever which Dr. Dancer calls malignant, that we conceive the restriction here adopted would only tend to increase the confusion on a subject already too much confused. The author indeed seems to be aware of the difficulty which attends the classification of the various forms of fever, and candidly informs us of the opinions of several authors of respectability, whose sentiments on this subject differ materially from his own.

The malignant fever, which next comes under consideration, he says, "is supposed seldom to exist in warm latitudes; sometimes, however, it unquestionably does occur: whether the yellow fever is one of this kind is not agreed on, but it probably is so in some instances."

A history of the nervous and malignant fevers, and the general plan of treatment, are briefly detailed; we shall not, however, detain our readers upon a subject which must be perfectly familiar to them, but shall proceed to that fatal species of the disease denominated the yellow fever. We are persuaded that we shall gratify our readers by presenting them with copious extracts from this important section, which we feel the more inclined to do, as the description of the disease, though undoubtedly the result of accurate observation, in some particulars differs from that given by other medical writers of great celebrity. "Concerning the nature and treatment of the

the disease called the yellow fever, the opinions of physicians have been so various and contradictory, as scarcely to admit of any reconciliation; but the misunderstanding on the subject has probably been, in a great measure, owing to an improper use of terms, or to the disease varying its character very much, according to circumstances of season, the quantity and force of contagion, and other causes. From comparing what the several authors on this subject have written, and from the observation I have myself had the opportunity of making, I am fully convinced, that the fever *called* yellow fever is not uniformly one and the same disease, but is often a compound one, partaking at one time of the nature of the malignant fever, at another resembling the bilious remittent. It may commence under either form, sometimes as an ordinary remittent, afterwards becoming malignant; or it may attack with symptoms of malignancy, but in its progress become mild, and change into a common fever: hence it may be contagious or otherwise; hence the fever of new-comers may not always be malignant; there are many instances of such having, on their first arrival, a fever of the common kind, and afterwards the yellow fever, though the reverse of this ordinarily happens."

It is generally agreed, that under the title of yellow fever a number of diseases have been described differing in several essential particulars, and scarcely resembling each other, except in the yellowness of the skin, a symptom so extremely common in warm climates, and occurring on such a variety of occasions, as to render it by no means a sufficient test of the identity of two diseases. When one author tells us, that this fever may be either contagious or otherwise, and that it partakes at one time of the nature of the malignant, and at another time resembles the bilious remittent, we cannot but be struck with the degree of uncertainty, which is experienced even by those practitioners who have had the most favourable opportunities of observing its origin and progress.

"As the limits of this work will not allow room for discussion on this very important subject, I must refer to the authors who have treated at length upon it. I shall here state what is the most ordinary and undisputed case of yellow fever, and describe the treatment which experience, in this island, has proved the most efficacious and successful.

"This fever then, peculiar to new-comers, attacks suddenly, with alternate fits of heat and cold, violent pain in the head and back: the face is prodigiously flushed, the eyes are red and

and watery; the whole physiognomy of the patient is very peculiar, denoting anxiety and dejection of mind; and this unnatural appearance continues, till recovery begins to take place. The pulse, in the beginning, is frequent, full, and hard—sometimes irregular; the heat of the body very great; and the patient labours under great inquietude. This state of the fever continues for a longer or shorter period; sometimes only for a few hours, at others for several days; and, when the ardent symptoms begin to decline, if not sooner, an irritation at the stomach commences, which is hardly, by any means, to be subdued or even allayed. The patient now feels himself in other respects well, his pulse and heat being nearly natural, and he has seldom any return of fever; but the irritation and anguish at the stomach continuing, he at length vomits blackish matter, his eyes and neck first become yellow, and then the whole body*. Blood flows from the mouth and nose: delirium, preceded by a hurried perturbed state of mind, and great restlessness, at length comes on; ending in total insensibility, &c. and ultimately in death.

"This fever is particularly distinguished by its sudden attack, being seldom preceded, like other fevers, with any symptoms of languor, weariness, &c.—by its having no very sensible abatement or remission, till it totally subsides—by the extraordinary anguish about the precordia, and at the same time a torpor of the bowels, which render them incapable of being acted on by purgatives, though of the most active kind, and in large doses.

"The foregoing account of yellow fever, that is to say, the fever generally attacking now-comers to this island, is drawn from actual observation; and, although incomplete, it is presumed is sufficiently full and accurate, to enable any one to distinguish it from any other, except the malignant, to which it has an obvious affinity."

It is, no doubt, universally allowed, that Europeans, upon their first arrival in the warm climates, are peculiarly liable to be affected by the diseases which prevail there; but we also are assured, that the old inhabitants are not exempted from these evils; to describe, therefore, the yellow fever as "peculiar to new-comers," and to make this circumstance a principal mark of discrimination, appears to us obviously objectionable. This will appear to be still more the case, when

* "This yellowness is not a constant symptom—sometimes it does not appear, or not till after death. The fever is, therefore, improperly denominated Yellow fever."

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we consider, that, according to Dr. Dancer himself, " there are many instances of new-comers having, on their first arrival, a fever of the common kind, and afterwards the yellow fever; though the reverse of this ordinarily happens."

" What I shall say upon the treatment of the yellow fever, must be considered as applying to that form of it above described.—Where it attacks in the manner of a common remittent, and shews no symptoms of malignancy, till after some continuance, the method of treatment here recommended, may not be thought necessary or suitable, though I think it is, upon the whole, safest, in these times, to consider every fever with which a new-comer may be attacked, of this kind; for, if the mode of cure suited to it, is not adopted in the beginning, it cannot be employed afterwards, with any probability of success.

" Supposing then a person, more especially one newly arrived in this island, or any other tropical country, should be suddenly seized in the manner before described; viz. with violent pain of the head and back, with heat and flushing of the face, &c. the question is, how he is to be treated, so as to prevent the future danger, so much to be apprehended?

" I am to recommend here, the practice which I think experience has confirmed as the safest, and the most efficacious; but I shall not omit to speak afterwards, of the several other modes of treatment that have been employed, and it is to be presumed frequently with success; for methods seemingly opposite, may sometimes prove equally efficacious.

" In the first place, then, let the patient, as soon as he is taken ill, be put to bed—let an opening clyster be administered —and, as soon as possible, give him a dose of calomel and jalap, either in powder, mixed with tamarind syrup, or else made into pills; some time afterwards he may take a teacup full of tamarind water, or decoction of tamarinds, with cream of tartar; and, if stools are not freely produced, in the course of five or six hours, let the pills of jalap and calomel be repeated in the same or a less dose. Supposing plentiful evacuations to have taken place, but without any abatement of symptoms, the headach, flushing of the face, &c. continuing the same, small doses of calomel and antimonial powder may then be given every three hours, interposing the use of the saline julep. At the same time, let the mercurial frictions be commenced; viz. two drachms of the strong mercurial ointment, rubbed into the inside of the knees and thighs, every six hours, or in some cases every three hours, or else half an ounce every

six

six hours. If, in twelve or fifteen hours from the first attack, there be not any obvious remission, in consequence of the foregoing treatment, continue the frictions every three hours, giving at the same time ten grains of calomel, combined with jalap, if the bowels have not yet been opened, or else with one quarter of a grain of opium, to prevent the calomel acting on the bowels, if too loose. Thin gruel, barley-water, &c. to be frequently given; and the above method persisted in, till the breath becomes affected, and the mouth sore, provided no clear and distinct remission of fever intervenes. If the stomach becomes irritable, and retchings commence, apply a blister immediately to the stomach itself, or else between the shoulders, and give æther, either in a little water, or in the saline julep, or camphorated mixture. The quantity of mercury required to be rubbed in, and calomel taken, is sometimes very considerable, before either the glands of the mouth are affected, or before any remission of the symptoms takes place; but, for the most part, when the mouth grows sore, the fever and irritation at the stomach subside; notwithstanding which, it is deemed necessary to continue the frictions, in a more moderate way, to promote or keep up the spitting.

"It cannot be pretended that this mode of treatment is uniformly successful. The violence with which the fever frequently attacks, affords, in many cases, but little hope from any mode of treatment whatever; but, comparing this practice with any other in use, it is, in my opinion, eminently *successful*; and it has this advantage, that it gives the patient a double chance, for it does not hinder the employment of any other means that could be made use of, were mercury not exhibited. The sore mouth which results from the use of mercury, is often very distressing, but is seldom attended with any danger or inconvenience of long continuance; it is not easily removed, but is greatly alleviated by the frequent use of proper gargles or mouth-waters. The bark also may now be given, but it is not always found to agree, and therefore food and wine are the only things further required."

Our readers will perceive, that Dr. Dancer has been more desirous to describe the appearances of the disease, as it has occurred to his own observation, and to give such practical directions for its treatment, as have been sanctioned by his own experience, than to enter into any theoretical discussions respecting its nature and origin. Some of the questions respecting the yellow fever, which have been the subject of so much controversy, are, however, by no means merely speculative,

lative, but such as must materially affect the means made use of, both in preventing its farther progress, and in diminishing its violence when actually present.

The object of the work now under consideration must, no doubt, in a great measure, preclude any long hypothetical details; yet we cannot but regret, that so candid and accurate an observer, as Dr. Dancer appears to be, should have omitted to state his opinion on some points which appear to us of considerable importance. We think that the author does not express himself with sufficient precision in what he says respecting the contagious nature of the disease. He supposes the disease to be sometimes contagious, and at other times not so; yet we are not clearly informed under what circumstances this remarkable variation in its nature takes place. Are we to conclude, that it depends solely upon a greater or less degree of violence in the symptoms? Though we can scarcely conceive any other way in which the same disease can at one time possess the power of generating contagion, and at another time be deprived of it, still it is scarcely possible to reconcile this idea with the expressions made use of by our author.

The plan of treatment pointed out appears judicious, and seems to be the result of experience. Upon a subject on which there has existed so great a variety of opinions among those persons who have had the best opportunities of judging, it cannot be expected that we shall venture to give a peremptory decision. The reader will observe, that Dr. Dancer is very sparing in the use of the lancet; and, notwithstanding the mass of opposing evidence, which at first view would appear almost irresistible, we are informed, that this practice is daily gaining ground among the most judicious of the American and West Indian physicians. The mercurial plan, which, it will be perceived, is carried by our author to a considerable extent, appears also to be sanctioned by daily experience of the advantages derived from its employment. Dr. Dancer very properly adds, "this method of treatment, however inconsonant to theory or preconceived notions, has stood the test of experience, and ought to be adhered to until a better has been discovered, which, I understand, has been promised from different quarters, and which, it is hoped, will not be long withheld."

A concise view is given of the practice of some physicians of celebrity, whose plan of treatment differs from that recommended above. "Dr. Hilary bled in the beginning of the disease, afterwards purged, then gave sudorifics and cordials.

"Dr. Moseley recommends repeated bleeding in the first stage, and continued purging with vitriolated tartar.

"Dr. Rush bleeds plentifully and repeatedly, gives purges with jalap and calomel, then continues the calomel alone till it affects the mouth.

"Dr. Jackson bleeds to twenty ounces or more, throws cold water on the body."

We have frequently regretted that the affusion of cold water, which appears in this country to have fully answered the expectations that were raised by the publication of Dr. Currie's Medical Reports, should have excited so little attention among the American and West Indian practitioners. Its effects in diminishing the temperature of the body, would seem to point it out as a peculiarly appropriate remedy in those fevers, where it is increased so much beyond the healthy standard, and where the symptoms appear to be so greatly aggravated by the excessive heat of the climate; while the power which this remedy frequently exhibits of absolutely putting a stop to the febrile action, would seem no less to recommend it in those diseases, which, if possible, require to be checked in their earliest commencement. We have, indeed, lately had the pleasure of receiving several accounts of the successful employment of this practice, and the consequent probability of its more extensive application. Some remarks on the prevention of the disease conclude this section. "As prevention is always better than cure, it may be expected that some directions should be here given, for guarding against the attack of this fatal fever; I have therefore to observe, that although bleeding is precarious and hazardous after the fever comes on, it may nevertheless, in particular cases, or where the habit is very full, &c. be considered as a means of prevention. It will not be amiss for young and athletic persons, on their first arrival, to lose a few ounces of blood; on the same principle they ought to keep an open belly, and avoid every species of intemperance, as also exposure to the sun and evening air; but what is of greater consequence, is that of flying, as soon as possible, from the shipping and sea-shore, the seats of infection, to a pure, airy, cool situation in the country, there to remain for some months. I have known many young men who, by this means, have avoided any dangerous fever; and some who, by returning too quickly to the towns or sea-ports, have met their fate *.

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* "Although people who have resided long in the climate are not subject

"The prevailing mortality among new-comers is a good deal to be attributed to their own misconduct; coming out in convoys, they arrive in numbers; they meet at taverns; and, allured by scenes of novelty, they walk the streets, indulge to excess in the use of the country fruits, and enter too readily into the customs of the seasoned inhabitants, which are not at all suited to persons in their situation."

In a note is subjoined a list of the authors who have treated upon the yellow fever: Lining on Yellow Fever, Literary Medical Essays—Hilary on Diseases of Barbadoes—Lind on Diseases of hot Climates—Lind de Febre flava—M'Kittrick de Febre Benghal—Roupe de Morb. Navigant.—Blane on Diseases of Seamen—Hunter's Diseases of Jamaica—Moseley on tropical Diseases—Chisholm on pestilential Fever of Grenada—Rush on Fever at Philadelphia—Clark on Diseases of Dominica—Jackson on Fever of Jamaica—*Idem* on Fever of St. Domingo—M'Lean on ditto—Bean on ditto at Surinam—Anderson's Observations on bilious Fevers—Lastly, the ingenious Thesis of Dr. Charles M'Larty, de Typho Regionum calidarum.

The next section treats of the bilious remittent Fever: "This is the prevailing fever in all hot climates; how far it is distinguished from the yellow fever, or whether that fever be not the remittent in a more concentrated form, practitioners are not agreed: the common remittent, however, does not, in general, attack so suddenly, or so severely; it is preceded with symptoms of lassitude, and comes on, ordinarily, with a slight cold fit or shivering, which is quickly succeeded with all the ordinary symptoms of fever, viz. pain in the head and limbs, hot skin, quick pulse, thirst, but more particularly with sickness at the stomach, and vomiting of bilious matter. These symptoms continue, without any abatement, for six, twelve, or twenty-four hours, when a remission, more or less distinct, may be observed; but which is perhaps of no long continuance: a fresh accession of fever taking place, with return of headache, sickness at the stomach, &c. but without shivering, as at first. There are often two exacerbations and remissions in the course of twenty-four hours; one paroxysm coming on about noon,

ject to the fever called yellow fever, it is, nevertheless, a melancholy truth, that numbers of persons from the country have caught fevers in town apparently of a malignant kind, and which have proved suddenly fatal: I can recount a number of such instances occurring within a short space of time."

another in the evening; or else a morning paroxysm happens one day, and an evening paroxysm another; but what is called the type of the fever, is not always to be distinctly marked, the paroxysms, after the use of vomits, purges, &c. in the course of a few days become less severe, the remissions more sensible, and the patient gets a crisis; or, on the other hand, the fits become worse on every return, the vomiting being more severe, delirium coming on, with great prostration or loss of strength, hiccup, black vomit, universal yellowness, &c.

"To a fever of this kind, all the inhabitants of tropical countries are indiscriminately and repeatedly liable, but principally young people, and such as are plethoric. It is brought on by intemperance and over-exertion; but particularly by exposure to the air of marshes and damp situations, and is therefore reasonably supposed to be caused by noxious effluvia generated in these places."

The yellowness of the skin, which is described as a constant symptom in this species of the disease, must necessarily render it difficult, sometimes impossible, to distinguish it from what has been described as the yellow fever. But whether we consider them as essentially distinct diseases, or the same disease differing only in the degree of violence, it appears to be agreed that a different plan of treatment is requisite. The method of cure of the bilious remittent, as given by Dr. Dancer, will be found to resemble, for the most part, that adopted in the typhus of this country.

The chapter on Fevers concludes with an account of the intermittent, which is observed to be "much less prevalent in hot than in cold climates. In certain situations and seasons they are, however, not unfrequent and sometimes obstinate, leaving behind them (as well as remittents) obstructions of the liver and spleen." As this section contains no information which must not be familiar to our readers, we shall not detain them with any further remarks upon it.

We have dwelt at considerable length upon this chapter, as well on account of the importance of its contents, as from our desire of enabling the reader to form a judgment of the merits of the work, from observing the manner in which the author treats a subject which has of late excited so much attention among all persons interested in the advancement of medical science. In the remainder of this article we shall chiefly confine ourselves to the consideration of those diseases which are either peculiar to the West Indies, or in which the

symptoms

symptoms and plan of cure are affected by the nature of the climate.

The second chapter gives an account of the bowel complaints frequent in the West Indies, among which the dysentery naturally takes the lead. "Next to fevers this is the most prevalent and the most dangerous malady of hot climates. It is frequently epidemic on board of ships, in hospitals, camps, and among the negroes on plantations, carrying off great numbers." After a description of its plan of cure and usual treatment, he concludes with the following general directions: "the cure of this disease consists in cleaning well the bowels in the beginning, and keeping them open; by restoring the perspiration, and easing the pains or gripes, by warm bath, fomentations, emollient and anodyne clysters, by blisters to the abdomen, and by opiates after due evacuations; lastly, by strengthening the bowels by tonics.

"The disease being an extremely offensive and contagious one, the utmost attention to cleanliness is required: the stools are to be immediately removed, and the utensil washed, the patient's clothing and bed-linen daily changed, and the room duly ventilated; but care should be taken, that no current of air blows on the patient, to check the perspiration. A flannel shirt will accelerate the cure, and prevent relapse.

"The diet, in this disease, constitutes a principal part of the treatment: drinking plentifully of demulcent liquors will serve greatly to ease the bowels: the food should consist at first, of nothing but sago, Indian arrow-root, &c.; afterwards wine and spice may be added, and weak broths allowed, calves foot jelly, &c."

After dysentery the author proceeds, perhaps a little irregularly, to consider the diseases of the liver and spleen. "Diseases of the liver," he says, "are either a cause or a consequence of fever, and are therefore, in this place, properly the subject of consideration." Though this be for the most part true, yet it cannot be admitted as a general proposition without many restrictions. It has even been doubted by some, whether fever be ever the sole cause of these complaints, while the feverishness which exists in some chronic affections of the liver is so inconsiderable as scarcely to deserve notice; it is sometimes also to be regarded as less the effect of the disease, than of the remedies employed for its removal. "A disease of the liver is known from pain and enlargement in the right hypochondre, *i. e.* under the cartilages of the ribs on the right side. Of the spleen, from the same symptoms on the left side,

side, or towards the left hypochondre. Both the one and the other is occasioned by long-continued intermittents; but they also come on from other causes, as cold, &c. and particularly from the intemperate use of ardent spirits."

We were a little surprised that the author, in speaking of the exciting causes, should not have noticed the effects of hot climates; we do not recollect having before seen cold enumerated among the causes of the diseased liver. "Obstructions in the liver are sometimes attended with symptoms of inflammation, fever, and violent pain; at other times, with jaundice, and occasional dropsy.

"In some cases, or where the disease is seated in the concave, or under part of the liver, there is no swelling or hardness to be perceived.

"Sometimes the disease gives little uneasiness, people labouring under it for many years of their life, without any acute symptoms; but, when attended with pain and fever, the earliest and strictest attention is required, to prevent inflammation terminating in abscess. Copious bleeding, then, is, in the first place, to be had recourse to; then laxatives; fomentations, and blisters to the part. If the symptoms do not quickly give way to these means, mercurial frictions are to be employed: two drachms, or more, of mercurial ointment must be rubbed every day into the right leg and thigh, and five grains of calomel given every night, till the mouth is affected, or the symptoms are mitigated. A Burgundy pitch plaster may be of great service in preventing relapse, and bitters with chalybeates will be afterwards proper for restoring the tone. A mineral water, containing the metal in a diluted state, is preferable; the artificial Pyrmont, prepared with Nooth's machine, may be substituted for any natural chalybeate; or ten or fifteen grains of salt of steel may be dissolved in a quart of water, with the addition of a tea-spoonful of elixir of vitriol, to be used in the course of the day.

"Affections of the spleen are to be considered and treated in the same manner as those of the liver. The nitric acid, which has been employed as a substitute for mercury in the lues venerea, has been likewise used in its place in obstructions of the liver and spleen.

"Persons having frequent returns of the liver disease should go to a cold climate; the best remedies on their arrival there, are the chalybeate and purging waters, particularly the Cheltenham waters, in England.

"Obstructions

"Obstructions of the liver, and inflammation, sometimes terminate in abscess, which may break internally into the duodenum, and the matter be discharged by stool. When this abscess points externally, it must be opened by the lancet; which may be done with safety and success.

"Diseases of the liver are also followed by a looseness, or bloody watery stools, like the washings of flesh; which shew an incurable disease. There is also a liver cough and consumption; viz. where an adhesion takes place between the liver, diaphragm, and lungs, and the abscess of the liver breaks into the lungs."

We imagine that most of our readers will agree with us in thinking the quantity of mercurial ointment prescribed very large; especially when it is considered that the state of the body, which not unfrequently attends a disease of the liver, renders the system little able to bear the debilitating effects of this powerful medicine. We regret that the author has not given us more fully his opinion respecting the efficacy of the nitric acid in this complaint; in the lues venerea we shall afterwards find that Dr. Dancer bears his testimony to its virtues as a valuable auxiliary to mercury.

The only remaining disease of the bowels which offers any thing peculiarly deserving of consideration, is that species of colic known in the West Indies by the title of the dry bellyache. The symptoms and cure of this complaint so exactly resemble those of the colica pictonum of this country, that it has been supposed by many practitioners to proceed from the same cause, viz. the poison of lead; and this mineral has actually been detected in the rum which is so plentifully drank in Jamaica. We shall find, however, that our author attributes it to a different cause. "This torturing disease is much less frequent than formerly; which circumstance is not improperly imputed to several changes in the mode of living, and to a different manner of clothing*; which, in the present day, renders people less liable to be affected by the alterations in the air from heat to cold. The colica pictonum, and Devonshire colic, (the colic caused by lead,) has so close a resemblance to the dry bellyache, that they have been thought the same disease, and the dry bellyache has been supposed owing to the same cause, viz. the poison of lead contained in rum; but the

* "I have known several persons who were liable to returns of this complaint, get the better of the disposition towards it, by wearing warm clothes. Bellyache people should always wear flannel next their skins."

disease frequently attacks persons who never use rum, or any liquors that can be supposed to contain lead, and is brought on manifestly by other causes; viz. by suppressed perspiration from cold, after being in a heated or fatigued state *; particularly if, at the same time, there be a redundancy of bile in the first passages, and the bowels are constipated. That the lead contained in new rum may be sometimes the cause of it amongst the soldiery, as is contended for by a respectable writer †, is not disputed; but I am of opinion, it is much more frequently to be attributed to the causes above mentioned; to which soldiers, in their barracks, are particularly exposed.

"Cold, or a current of cool air, directed upon the body in a debilitated state, and when perspiring, produces sometimes, in place of bellyache, a total loss of power in the limbs, or a species of palsy, that may not perhaps be improperly termed the *rheumatic*; though it is not always attended with severe pain: at other times, cold so applied is the cause of tetanus, or opisthotonus, in which the symptoms are exactly the same as when brought on by wounds of the tendons and other injuries, though not so severe, or so certainly fatal.

"Although the dry bellyache, and colic from lead, arise from different causes, the symptoms are so much the same, that the cure cannot greatly vary ‡.

"The disease, if neglected or ill treated in the beginning, is extremely obstinate, and leaves dire effects. The patient suffers the most excruciating torments for days, and sometimes weeks, without any evacuations by stool, and afterwards loses all power in his arms and hands, and sometimes also of his legs."

* "From this cause alone, the author was once affected with this direful complaint, by which he lost the use of his arms and legs for several months."

† "Dr. Hunter, *Med. Comment.* 1788.

"Dr. Hunter detected lead in the rum used by the soldiers, by the most unequivocal proof; yet, the author of Observations on tropical Diseases does not scruple to assert, that such "*chimeras* (viz. as that of lead in rum) *shew little chemical, and much less medical, knowledge.*" Lead, according to this chemist, is perfectly innocent whilst its phlogiston is bound down to its earth. Cerusse is also innocent until its phlogiston is revived!—Notwithstanding the foregoing remark, the accuracy of which I shall leave to others to judge of, I think it my duty to caution against the effects of lead. Negro plumbers are in the custom of casting leaden spoons, the use of which is extremely dangerous."

‡ "Mr. Alibert, however, has observed, that the Madrid colic, though resembling exactly the colic of Poictou, did not admit of relief by the drastic method practised at Paris in that disease. *See Med. and Phys. Journal, No. 12.*"

In

In the treatment of this disease the author proceeds upon the plan which experience has sanctioned in the colic produced by lead. Dr. Dancer particularly recommends the wild cassada in this complaint, which in desperate cases he thinks is entitled to a pre-eminence over any other remedy.

The third chapter treats of the Inflammatory Diseases. As these are frequently produced by cold, and in almost all instances greatly aggravated by it, we might be led to conceive, that in the hot climates they would be of very rare occurrence. But though they are for the most part both less frequent and less severe than in the northern latitudes, the inhabitants of the West Indies are not exempted from them. There are even some circumstances which render their bodies (previously relaxed by the excessive heat) peculiarly liable to suffer from the effects of cold. These are pointed out in the section on Rheumatism; and the same observations may be applied to the other diseases of this chapter. "The cause of rheumatism is well known to be cold, partially applied, more particularly when the body is in a heated and perspiring condition; and this is what persons in the West Indies are much exposed to, from their houses being so constructed as to be favourable to a draft of air, from the sudden changes of weather, in certain months during which the north winds prevail, and from the occupations followed by the majority of the inhabitants, who either pass a sedentary and confined life, rendering them susceptible to the slightest impressions from cold, as that of clerks; or, on the contrary, are much exposed to the inclemency of the open air, in all seasons, and at night hours; viz. book-keepers, doctors, and others. It is therefore matter of surprise, considering the foregoing circumstances, that there should be so few instances of rheumatism. The most effectual way of guarding against it is, by hardening the constitution; *i. e.* by inuring the body, by degrees, to every change of atmosphere. To this the daily use of the cold bath eminently contributes. The next most important preventive, is the wearing of flannel next the skin."

The different kinds of Hæmorrhagies are the subject of the fourth chapter; and Catarrh and Consumption of the fifth. This latter disease "is generally thought to proceed from catarrh or cold. In some instances it probably may, but it much more generally arises from the same causes as blood-spitting, viz. a peculiar make and constitution; and it is therefore hereditary in many families, of which we have too many melancholy proofs.

 "A scro-

"A scrophulous taint, causing tubercles in the lungs *, is the constitutional peculiarity which is thought to give most frequent rise to this complaint; that sweeps off, in northern climes, so many of the young of both sexes †, but more particularly females, and those too of the most beautiful form, at the age when they are designed to charm and delight. It is the privilege of the inhabitants of the tropics, to be in a great measure free from phthisical or consumptive complaints; but the exemption is not absolute, for there are not wanting examples of genuine phthisis among even natives, who never were off the island ‡."

We cannot require a stronger proof of the propriety of removing phthisical patients to a warm climate than this fact; the frequent failure of this practice may probably be attributed to its being too long deferred; though the disposition to consumption may be prevented, we can scarcely expect that this, or any other remedy, should relieve the disease when it is once fully formed. The following quotation affords a singular example of the manner in which the judgment may become warped by an attachment to a favourite hypothesis. "Dr. Davidson having, by experiments with the eudiometer, satisfactorily proved that the atmosphere within the tropics contains more oxygen than in Europe, has drawn conclusions that would invalidate the opinion that has hitherto ever been entertained, of the use of sending consumptive people to a warm climate. He further says, that consumption is very general in some of the West India islands, and more quickly fatal than in Europe. The good effects of voyaging he thinks wholly owing to sea-sickness, which prevents the lungs decompounding and absorbing oxygen in the usual quantity."

In the sixth chapter, which contains an account of the contagious eruptive diseases, or what are usually called the

* "Consumption is referred to several other causes, constitutional and accidental; but this seems to be the most general cause of genuine phthisis. Dr. Ryan denies that it is ever produced by bloodspitting. Dr. White considers consumption as of two kinds; one, from inflammation only; the other, when there is purulent matter."

† "Of the number of deaths in London, nearly one third are by consumption:

In 1796,	out of 18,238	- - - - -	5910
1797,	16,714	- - - - - -	5439
1799,	17,285	- - - - -	6210."

‡ "Dr. Beddoes, who has been laudably devoted to the investigation of the nature and cure of this malady, hitherto the *opprobrium medicorum*, mentions, that butchers, soapboilers, catgut-makers, fish-women, and others concerned in putrid processes, are not subject to consumption."

Exanthemata,

Exanthemata, we learn, that "small-pox rarely makes its appearance in Jamaica but from inoculation." The remaining diseases of this class, we are informed also, "but rarely occur in that climate, and are seldom dangerous, or much less so than in cold countries." These observations appear to favour the notion, that the matter of contagion in small-pox, and other similar diseases, is decomposed and rendered inert by a high temperature; it seems certainly the case with the vaccine fluid. Were not the diffusion of the small-pox prevented by this fortunate provision of nature, it might be apprehended that the heat of the climate, together with the peculiarities of the West Indian constitution, would have rendered it a still more malignant and fatal disease than that experienced in the colder regions.

We are likewise informed that Dropsy, which is the subject of the seventh chapter, "is not a very frequent disease in the West Indies; but when it does occur, it is as uncertain of cure as elsewhere: the most common case is hydrothorax, or dropsy of the chest. The remedies for dropsy are numerous, but very precarious; they all succeed in turns, but hardly any of them twice together; which accounts for the contradictory accounts of their efficacy." Our author agrees with Dr. Rush, that the increased effusion from the exhalents may be sometimes a consequence of their increased action, and that, in such cases, bleeding may not be an improper remedy. In the treatment of this complaint, Dr. Dancer does not materially differ from that adopted by the practitioners of this country. No cause is assigned for the greater proportion which hydrothorax bears to the other species of dropsy, nor does it appear easy to account for this singularity: diseases of the liver, which are the characteristic complaints of warm climates, are generally supposed to have a peculiar tendency to produce ascites. The hydrothorax of the West Indies does not appear to differ in any of its symptoms from the same diseases in this country.

After dropsy the author proceeds to the consideration of this singular malady, called Malacia Africanorum, Pica nigritum, or the Disease of Dirt-eating among Negroes. "The man who could effectually explore the cause and cure of this disease, so fatal to negroes, and so ruinous to their owners, would deserve a statue *. I have to lament that, after much consideration

* "I know of no calculation of the general mortality by this disease, but it sometimes sweeps off one half or more of the negroes on a plantation.

deration on the subject, I have but little to offer that is new, or that is likely to be deemed satisfactory; but I shall here bring into one point of view all that I can collect from experience, reading, and information, and endeavour to make the best application of it in the investigation of a proper mode of treatment."

"The negroes who eat dirt complain, first, of pain in the stomach, (whence the French call it the *mal d'estomac*,) then breathlessness on the least motion, attended with visible pulsation of the carotids, or the arteries of the neck; they next become bloated; their nails and the palms of their hands become white, and their lips, gums, &c. quite pallid, shewing the want of red globules in the blood. These symptoms continuing and increasing, the patient sooner or later dies, sometimes in a very short space of time; at others, through the aid of medicine and nourishment, his fate may be protracted, but he rarely recovers."

"What analogy there is between chlorosis and the pica, I shall not take upon me to ascertain; but diseases which so strongly resemble each other in their symptoms, must, it is presumed, have a common cause. The remote causes may be indeed various and dissimilar, but the proximate one must be the same; and, as in chlorosis, it is evidently debility in the stomach, so it must in pica and dirt-eating; which must be looked on either as a sporadic disease affecting individuals, or endemical, affecting great numbers, at the same time. When the major part, or a great number of negroes on a plantation, or new negroes on landing, take to dirt-eating, it would be ridiculous to consider the disease as the effect of any constitutional circumstance. We must search for the cause elsewhere, and we shall find it no where but in the passions *. A deficiency of food, and hard labour, though it may contribute to bring on the disease, will not occasion it, where there is not a dissatisfaction or discontent of mind; on the contrary, these

tion. It is, according to Dr. Chamberlaine, (to whom I am indebted for several remarks,) much more prevalent since the large importation of Angola negroes, who are more particularly addicted to dirt-eating than any others. Dirt-eating prevails more in wet than in dry parishes; in Port Royal mountains it is almost unknown, though it is frequent in St. Andrew's; which is, perhaps, owing to there being none of the earth they are fond of in the former situation."

* "The negroes on an estate, from dissatisfaction took to eating dirt, and great numbers of them died. The overseer being discharged, the complaint ceased, but the survivors declared that, if the overseer had remained, they would all have given themselves up to the same fate."

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are alone, or of themselves, sufficient to cause it, without any scarcity or hardship: it signifies nothing from what source the dissatisfaction arises, or whether there be any grounds for it; but the ordinary motives for it, are a change of master, attorney, overseer, or driver; the dispossessing them of their grounds or habitations; shifting their residence, particularly from the lowlands to the mountains; but, perhaps, *obeah*, or the terror of witchcraft, is a much more frequent cause than any: this at least must be suspected, where there is no apparent ground of complaint †: but whatever motives actuate them to eat dirt, they always do it secretly and clandestinely. There is scarce a possibility of detecting them, and they will never acknowledge it. Nothing can extort from them the confession, which shews they are either under the influence of some horrible superstition, or bent on some fell purpose. I consider this disease then, as sometimes a *voluntary* one, proceeding from hopeless, though perhaps causeless grief, and a determination either to shun or revenge certain evils, by self-destruction. This purpose is at first formed among a few *grandee* people, or those who have a great ascendency over the minds of others; and the rest follow their example, by a kind of fascination. When this once seizes them, they daily devour, with the most voracious avidity, large quantities of earth, at first of one kind only, afterwards of every kind indiscriminately, and quickly fall into that deplorable state of cachexy before described, from which they are not, by any means yet known, to be recovered. Such is the nature or force of this insanity, (for in this view I consider it,) that an alteration in the system of management, or a compliance with their own demands and wishes, will not in all cases put a stop to it. Threatenings and punishments of different kinds, such as humanity will certainly justify, have no effect. Of all these circumstances, I could adduce histories in proof, did they require authentication.

"Not to lose time, by any further disquisition concerning the nature of this disease, or by an inquiry how the passions give rise to this propensity, which I fear would be fruitless, I shall go on to speak of the treatment of it.

† "An experienced practitioner informs me, that on an estate which he attended, seventy negroes died of this complaint in a very short space of time, till it last it was discovered, through the information of one who was christened, that there was an *obeah* woman on the property; the terror of whom had occasioned this melancholy catastrophe: when a negro, as he observes, conceives himself to be under *obeah*, every accident he meets with, and every indisposition he feels, he attributes to the effect of magic, and his existence becomes a misery."

"*Treatment.*

"*Treatment.* — The symptoms arising from dirt-eating being exactly the same as in chlorosis, or green sickness, the same remedies have been usually employed; viz. emetics, purgatives, bitters, chalybeates, &c. with a suitable regimen of animal food, &c. which are now and then successful; but, when a great number of negroes take to this practice, at the same time, the disease is not to be overcome by any remedies yet known. The depriving them of dirt will not obviate the danger, for they appear to suffer as much from the prohibition, as from the indulgence.

"What then is to be done for the recovery of these poor mortals? In the first place, the strictest inquiry is to be set on foot, to discover the motive that has impelled them to this practice: if they have any reasonable pretext of complaint, their wrongs should be redressed, and their minds conciliated; but neither reparation for supposed injuries, nor any indulgence that can be shewn them, will always have the effect of making them desist.

"2. If they appear to be under the influence of magic or superstition, the *obeah* people should be searched for, and brought to punishment, and the bewitched negroes should be christened. This is the best, and perhaps the only way of completely exorcising them.

"3. Every thing should be done to render the practice infamous: an odium should be attached to it, or rather those who can prove themselves descended from families uncontaminated by this abhorred vice, should be held in honour.

"In respect of medical treatment, it has been already observed, that this consists in giving vomits, aloetic and other warm purgatives, chalybeates, bitters, &c. which, with nutritious food and wine, will, in some cases, succeed, if the disease has been brought on by any other complaint *; and must, in all cases, be resorted to, as the best means, till we are fortunate enough to discover some more effectual plan of cure, which I have been at pains (but I fear unsuccessfully) to investigate.

* "This is not unfrequently the case; a very respectable and intelligent planter informs me, that on a certain estate in St. Mary's, there was a great annual loss of negroes, by this malady of dirt-eating; but on removing the negro houses which had a bleak exposure, the negroes grew healthy, and were no longer subject to this complaint. It is therefore evidently of the utmost importance, to ascertain whether dirt-eating is a primary or secondary disease; that is, whether this inclination is the effect of some preceding complaint, or whether the symptoms are not brought on subsequent to the practice."

vestigate. I shall, however, venture to suggest what has occurred to me on the subject.

"The disease is characterized by a great degree of torpor; there is the same want of excitement as in jaundice, dropsy, &c. where the liver is affected, and where the stimulus of bile in the first passages is deficient. The dissections in the complaint have been few, and I do not know what grounds there may be, for supposing the liver concerned, either in occasioning the disease, or in hindering recovery; but, reasoning from analogy, (a loose one perhaps,) I have thought that mercurial frictions might be tried, for the purpose of exciting the action of the absorbent system, as in the fore-mentioned complaints, or as a stimulus to the sanguiferous system: experience, falsifying the notions formerly entertained of the effects of mercury, has shewn, that it is a most efficacious remedy in many diseases, where the administration of it some time ago would have been thought highly pernicious, if not fatal. The experiment, I think, then would be a justifiable one."

We have been induced, both on account of the peculiar nature of the disease, and from the very candid and judicious manner in which the subject is treated, to present the reader with very copious extracts from this section. He will probably agree with us in thinking, that this account of the malacia Africanorum proves it to be, at least in a great measure, a disease of the mind. It would be improper, in this place, to obtrude any of those reflections, which the above recital must excite in the breast of every one not destitute of the feelings of humanity. With respect to the medical treatment of this complaint, it appears to us that medicine can be but of little avail; nor are we disposed to place much dependance upon the supposed analogy which it bears to chlorosis. The desire of indigestible substances, which occurs in chlorosis, must be considered as dependant upon a peculiar state of the stomach, and merely an effect of the disease; whereas, in the malacia Africanorum, it appears, that the morbid symptoms are produced by the reception of earth into the stomach, the consequent incapacity of digesting the accustomed supply of nourishment, and, we may add, that depression of spirits which reduces these unhappy beings to the sad resolution of exchanging slavery for death.

In the eighth chapter we have an account of the nervous diseases, including apoplexy, palsy, epilepsy, locked jaw, hysteria, dyspepsia, and hypochondriasis: we shall confine ourselves to the consideration of tetanus. "Of all the diseases,

cases, in the long catalogue to which man is liable, this is perhaps one of the most horrible, though proceeding from the most trifling causes. The slightest wound, or puncture, in a tendinous part, is sufficient to give occasion to the dreadful spasms and convulsions which constitute this disorder, called *tetanus*, so well known as to require no description. It is sometimes brought on by an exposure to cold, or to the sudden stoppage of perspiration; and, in that case, the complaint is not so irremediable; warm bathing, sudorifics, and opium, if timeously administered, will afford relief; but when proceeding from the causes before mentioned, viz. punctures and wounds, particularly gun-shot wounds, wounds from glass, nails, thorns, or other substances penetrating the feet and hands, (accidents to which negroes in particular are much exposed,) the disease is, in most cases, fatal; as likewise when it follows the amputation of limbs. I will not say absolutely, that there are no instances of recovery, but I am sorry to say they are, indeed, very few."

The author reduces the various modes of treatment which have been adopted in this disease to four heads. The first is the cure effected by opium and the warm bath; the second, that by the cold bath, or by dashing and pumping cold water over the patient; the third consists in the use of mercurial frictions; and the fourth in giving large quantities of bark and wine. He remarks, that "several of the above means may be combined; mercury may be employed along with opium and the warm bath, and wine and bark along with mercurial frictions. Bark and laudanum may be also given when the cold bath is used. Some directions are added, by which "these dreadful symptoms, so difficult to remove, may be best prevented.

"Where locked jaw and tetanus are apprehended from wounds, pricks, &c. the first thing necessary is the free dilatation of the wound, and the removal of all extraneous and irritating substances, whether broken glass, nails, splinters of wood, shot, &c.; after which dress with lint and laudanum, or spirits of turpentine; then apply a soft poultice, or keep the part, if possible, in warm oil, for an hour at a time; afterwards, if a good digestion does not come on, the wound should be dressed with lint, warm spirits of turpentine, tincture of myrrh, the balsams, &c.; next, from twenty-five to fifty, or more drops of laudanum are to be given every night, or twice in the day, according to the effects, which will be very different in different patients. The bark with wine may be at the same

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time taken, and two drachms of strong mercurial ointment rubbed in, once or twice in the day, for four or five days, if the mouth is not previously affected.—By these means, locked-jaw and tetanus may be frequently prevented from coming on, where they might be apprehended from the causes above mentioned, and from amputation and other chirurgical operations, to which it frequently succeeds."

We are not informed to what particular modification of the disease the several remedies mentioned above, which must differ considerably in their operation, are respectively applicable; except that in the tetanus produced by cold, the warm bath, sudorifics, and opium, are recommended.

The length to which we have already protracted this article, will render it necessary for us to take a very concise view of the remainder of this valuable performance. We shall not, therefore, offer any remarks upon the account which is contained in the ninth chapter, of the Lues Venerea. The Yaws next come under consideration; this complaint, though almost peculiar to the tropical regions, has been so frequently described, as to have become tolerably well known to the British practitioner. The account of it given by Dr. Dancer does not differ from that of preceding writers; he informs us, that "the disease depends upon a morbific matter; which, to produce its effects, must be some way or other *inoculated*; but an abrasion of the cuticle or wound does not seem absolutely necessary; the matter applied to the surface is sufficient. It has been compared to the small-pox, and the other exanthematous diseases, the contagion of which is communicated, like the yaws, by a purulent matter; but there seems to be little analogy between them; for, 1st. The small-pox, and the exanthemata, are communicated through the medium of the air, as well as by inoculation. 2dly. Small-pox, &c. are preceded by fever, which is not the case in yaws. 3dly. The small-pox, &c. have a determined course, of only a few days; while the yaws may, by different modes of treatment, be protracted or cut short. The resemblance, then, appears fanciful, and leads to no practice."

With respect to the use of mercury in this complaint, we find the following remarks: "I have before insinuated a doubt whether any benefit is to be derived from medical treatment, unless locally. That mercury is productive of more mischief than good, when given early in the disease, is universally acknowledged, and whether it is ever necessary may be questioned; but, if it be employed in any way, the patient should be previously

viously made to take sulphur, and to use the warm bath for some time, to open the skin, and throw out the disease."

The chapter concludes with a brief account of Scrofula, which is said to be "seldom, if ever, seen in the West Indies," and some of the cutaneous diseases.

The eleventh chapter contains a number of judicious observations on the diseases and management of women and children; with respect to the latter part of the subject, the author remarks, that "a warm climate is favourable to infant life except in its tendency to occasion locked-jaw; and there are, therefore, few deaths among young children but from this disease, which rarely attacks any but those of negroes." This singular complaint, we are informed, "carries off great numbers of negro children, within the ninth day from their birth, and has been attributed to various causes; to the meconium not being purged off; to the improper treatment of the navel-string; to cold; to smoke, &c. &c.; but no attention that can be paid to any of these circumstances has been found sufficient to prevent the disease. It appears, therefore, from the inefficiency of any of the usual precautions, and from the disease occurring only within the ninth day, and how much soever any of the supposed causes may conduce to the bringing on of the disease, that it more immediately depends on a certain state and condition peculiar to infants, within that period. What that state arises from, physicians are not agreed; but, as tetanus in adults is more frequently occasioned by wounds in tendinous parts, than by any other causes, and as the tendinous ring of the abdomen, is, by the cutting of the navel-string, put into the state of any other tendinous wound or inflammation, it seems most probable to me, that the locked-jaw of infants is more immediately the consequence of this, than of any other circumstance. This opinion is confirmed by the superior good effects of laudanum, and turpentine dressings."

"The conclusion to be drawn from the foregoing remarks, is this; that as the disease may be variously brought on, it will not be prevented by attention to the navel alone, or to any single circumstance; but by a strict attention to several circumstances collectively, it may be rendered much less frequent. This is confirmed by fact and experience: the delivering women, in a lying-in hospital, as it is now customary on most large estates, where cleanliness is observed, where fires are prevented, where the navel is duly attended to, &c. has proved the means, if not of wholly preventing the mortality, which formerly prevailed

vailed among negro children by this disease, yet of greatly curtailing it: upon some estates they never lose any.

"The practice in several of the lying-in houses for negro women, and which I would recommend as the most effectual for the prevention of locked-jaw, is to apply to the end of the cut navel-string, soft lint dipped in spirits of turpentine; to foment daily with decoction of bark, to which may be added a few drops of laudanum, or tincture of myrrh; and then to apply lint, moistened with oil and spirits of turpentine. At the same time, one small drop of laudanum is to be given to the child, every night till the ninth day, and the bowels kept duly open by castor-oil, if necessary."

The body of the work concludes with a chapter on the complaints requiring surgical assistance, and on casualties, under which term are included stragulation, suffocation, the recovery of persons apparently drowned, and an account of the different kinds of poisons. In this latter part of the work we meet with a number of useful directions, conveyed, as usual, in familiar and perspicuous language.

An appendix is subjoined, which contains a collection of formulæ, a catalogue of such medicines as are necessary to be kept on plantations, an account of the simples indigenous in the country, indexes, &c.

From the ample extracts which have been given, the reader will be enabled to form his own opinion respecting the merits of the Medical Assistant. The principal aim of the author has been the communication of practical knowledge, and in pursuit of this object he has almost totally disregarded the speculations and theories, which, in general, compose so large a part of all medical writings. A spirit of candour and impartiality forms a distinguishing characteristic of the work; the author always appears more desirous to discover the truth than to establish his own opinion. With respect to style, it may fairly claim the merit of perspicuity; at the same time it must be acknowledged, that it never rises to any degree of elegance, and, in some places, almost descends into vulgarisms of expression. It can scarcely be expected, that a work embracing so great a variety of objects should, in every particular, be free from inaccuracies; and a difference of opinion upon many points which fall under consideration must necessarily arise. Upon the whole, however, we think it a performance highly deserving of commendation; it contains a large body of useful information, and must be regarded as a peculiarly valuable acquisition to the West Indian practitioner.

ART. III. *A Treatise on the Cow-pox; containing the History of vaccine Inoculation, and an Account of the various Publications which have appeared on that Subject in Great Britain, and other Parts of the World.* By JOHN RING, Member of the Royal College of Surgeons in London. Part I. Octavo. 496 pages. J. and T. CARPENTER, London. 1801. Price 8*s*.

MR. Ring's extensive experience and accurate observation of the vaccine disease, and his respectability as a medical practitioner, are well known, and render him peculiarly qualified to undertake the Treatise with which he presents us. The subject is one of the most important that can engage the attention of the medical profession, or of the public in general; and it was particularly desirable, that the great number of detached facts, and variety of opinions concerning it, which were scattered in periodical and other publications, should be collected and combined into one complete history. Much information was contained in the treatises of Dr. Jenner, Dr. Pearson, and Dr. Woodville; but there has been a great accession of facts since the appearance of those valuable publications, and many obscurities have been developed which before circumscribed speculation.

In the execution of a task so useful and requisite, it is only to be lamented that Mr. Ring had not adopted a more methodical arrangement. He promises, indeed, to supply that defect, in some degree, by a copious index, (to be subjoined to the second part;) but this can be but a very imperfect compensation for the neglect of order in the body of the work, since, though it may render reference pretty easy, it cannot present the reader with a connected view of the progress of discovery, nor supply the defect of a proper classification of such a variety of facts. However, the extracts with which we are about to present our readers, will amply evince the pains that the author has taken, and secure to him ample credit for ability, correctness, and impartiality.

After having combated an idea which has been very prevalent, and which has been a great objection to the general introduction of the cow-pox, viz. that it is a new disease, and that its preservative power was not suspected until promulgated by Dr. Jenner, Mr. Ring proceeds to treat of the origin of the vaccine distemper.

"The horse, it is well known, is subject to a disorder in the heel, called the grease. This, we are informed by Dr. Jenner,

Jenner, is endowed with the same prophylactic virtue as the vaccine virus, but in a slighter degree. In the dairy counties, men who have the care of horses, are sometimes also employed to milk the cows; and thus, for want of due attention to cleanliness, convey infectious matter from one animal to the other. Hence is generated the disease, called the cow-pox; which is communicated to the hands of the milkers, and from the hands of the milkers it spreads through the farm.

"It appears on the teats of the cows, in the form of irregular pustules, surrounded with inflammation. The colour of the pustules is a palish blue, approaching to livid. The animals become indisposed; and the secretion of milk is much lessened. Solutions of vitriolum zinci, vitriolum cupri, &c. are a speedy remedy for the pustules; otherwise they degenerate into phagedenic ulcers, which prove extremely troublesome.

"Similar effects are produced on the hands of the milkers; attended with febrile symptoms, and tumours in the axilla. These symptoms, Dr. Jenner thinks, arise principally from the irritation of the sores. Vesications and sores of the same kind may take place in other parts of the body; in consequence of their being scratched, and impregnated with virus, by the fingers of the patient, or any other cause.

"Dr. Jenner observes, that morbid matter of various kinds may excite a disease in some degree similar; 'but what renders 'the cow-pox virus so extremely singular, is, that the person 'who has been thus affected, is for ever after secure from the 'infection of the small-pox; neither exposure to the variolous 'effluvia, nor the insertion of the matter into the skin, pro'ducing this distemper'."

"Dr. Jenner now informs me, that he has lately received other satisfactory proofs, from several quarters, of the cow-pox being excited artificially by the matter of grease.

"A letter I received, while writing these remarks, from Mr. Rankin, a surgeon, of East Bourne, tends in a peculiar manner to confirm the idea of Dr. Jenner.

"After giving an account of the success attending his practice, in inoculating for the cow-pox, with matter sent by me, he relates the following curious and interesting case.

"'As I have somewhere seen it suggested, that the vaccine 'disease originated in the greasy heels of a horse, I will take 'the liberty to recite a case I met with here, about twelve 'months since, and before I had read any account of the cow-'pox.—I was sent for to see a farmer, who had a number of 'exceedingly foul, phagedenic-looking spots, on his face and hands,

'hands, about his mouth and chin especially; attended with 'a very considerable degree of fever, a full, quick pulse, vio- 'lent head-ach, foul tongue, thirst, &c. and the places gave 'him much pain.

" 'It appeared a kind of eruption I had never seen before; 'nor could I account for it any rational way. The spots looked 'rather like very large pocks, full of a semipellucid fluid; '*raised much at the edges, indented in the centre*, and sur- 'rounded with a livid erysipelatous inflammation which swelled 'the whole face, as there were more than a dozen of these pus- 'tulous ulcers.

" 'I was at a loss for the cause; but at that very time Capt. 'Mowatt shewed me an account of the disease in question, in 'a review.

" 'On making inquiry, at my next visit, about his cows, '&c. the farmer told me, that he had, a few days before the 'appearance of this disease, been dressing the heels of his 'horse for some scratches; that he had observed some drops 'of a fluid spirit from the hairs of his horse's heels into his 'face; and that he had just before been shaved.

" 'From every circumstance attending the case, and the 'description I then read, I have not the least doubt but his 'disorder proceeded from the heels of the horse; whether it 'had any analogy to the cow-pox or not.

" 'The ulcers were very difficult and long in healing; nor 'did the fever subside under a week.—He had no complaint in 'the axilla; though he had three or four spots on one hand.

" 'He had a servant boy affected in the same way, and evi- 'dently from the same cause, though not so violently; having 'only, as far as I can recollect, a spot or two on the upper 'lip, and one or two on the hands; attended with a degree of 'symptomatic fever, but no pain in the axilla.

" 'I hope you will excuse the prolixity of this; as I should 'be extremely happy to be the means of throwing any light on 'the disease; or of promoting a discovery, that promises such 'inestimable benefit to mankind.'

" This case, for which I am much obliged to Mr. Rankin, bears so near a resemblance to the casual cow-pox, that we have great reason to conclude, they both spring from the same source.

" A testimony like this, drawn up without any solicitation, by an unprejudiced person, cannot but have considerable weight, in determining the true origin of the vaccine disease."

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The number of persons who suppose the cow-pox to be derived from the small-pox are not few, and of this number too are several medical practitioners of great respectability. Our author's arguments in opposition to this opinion, if not conclusive, are at least supported by ingenious reasoning, and by many curious facts.

"Dr. Turton, of Swansea, expressed to me an opinion, which he has since published in the Monthly Magazine, that this distemper derived its origin from the small-pox. The circumstance of its breaking out among the cows in his father's farm, in two different instances, a short time after the small-pox had been in the family, seemed to warrant that conclusion.

"He added, that, in order to ascertain this point more clearly, he had directed a cow to be inoculated with variolous matter; and, if it produced any suppurative eruption, he would inoculate a child with the vaccine matter, and communicate the result.

"As no farther communication from Dr. Turton has appeared, we have reason to suspect that his experiment failed.

"An able answer to the letter of Dr. Turton appeared in a subsequent number of the same work; written by a gentleman, whom I suspect from his initials, and the knowledge of the practice which he displays, to be a relation of Dr. Jenner.

"This answer tends to refute all ideas of the vaccine disease degenerating in the human body, and of its identity with the small-pox. It proves, that such ideas could only be entertained by those, who had not seen much of the distemper: the author of that letter had seen the disease resuscitated above thirty times in the human subject: nevertheless it still retained its original form.

"A considerable part of the matter now in use, has been preserved, by reiterated inoculations in the human body, ever since the spring of the year 1799; yet, notwithstanding it has undergone so many successive trials, its purity has suffered no alloy, and its efficacy no diminutation.

"At the time when Dr. Turton wrote his remarks, appearances justified his suspicion. Some of the matter which was then in use, was either partly, or entirely, variolous. Indiscreet experiments were made. The virus became contaminated. Sometimes the cow-pox combined with the small-pox, and sometimes the small-pox alone, seemed to be the consequence.

"One instance has come to my knowledge, where a practitioner used a lancet armed with small-pox matter, by mistake.

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He dipped it in the cow-pox pustule, it is true; but it was at a late period of the disease, the twelfth day, when the virus may be supposed to have lost its efficacy, and to have become effete. It had also been repeatedly punctured and exhausted some days before; so that it must have undergone the greater change, both from the evacuation of its contents, and the admission of atmospheric air.

"The disease produced was the genuine small-pox; and, although it terminated well, would have brought some discredit on the new process, had not the practitioner, with a degree of candour that does him great honour, confessed his mistake.

"Though pustules, resembling the small-pox, have now and then occurred, in cases where it is not known that variolous matter was inserted: yet such occurrences have been rare, and the eruption has not been very considerable.

"Besides, it is well understood, that such eruptions may arise from other causes. I have known pustules, when produced by external applications, by the chicken-pox, the herpes miliaris, and other disorders, so nearly resemble the small-pox, as not to be distinguishable, by their appearance, from that disease.

"In one of the first five patients whom I inoculated with matter, which Mr. Paytherus gave me, by desire of his friend Dr. Jenner, pustules, exactly similar to those of the small-pox, appeared about the eleventh or twelfth day. Since that time, I have inoculated about seven hundred with the same matter. It has been disseminated, not only through all parts of this great metropolis, but through the whole kingdom, and to various parts of Europe and America; yet I have not heard of another case, where there was any material eruption.

"This matter was produced by some which had been received from Dr. Jenner. It has now been in constant use ever since the vaccine inoculation began to be established, yet it never has occasioned an eruption that could alarm the most timorous parent; and, in general, not a single pustule, except that on the arm.

"At the conclusion of his paper, Dr. Turton puts the following query: 'May not the cow-pox, by passing through 'the human subject too frequently, degenerate at last into its 'original disease, the small-pox? and should not this direct 'the practitioner to have recourse, as often as possible, to 'genuine vaccine matter?'

"Certain experiments, made when the nature of the true cow-pox was not well understood, justified that apprehension.

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The first appearances were fallacious. Time has now drawn aside the veil; and in some measure elucidated a point, which then lay enveloped in obscurity.

"The genuine cow-pock virus, having now so often passed the ordeal of the human body, and having been put to the severe test of so many successive inoculations, betrays not, at this moment, the least sign of degeneracy; the least sign of taint, the least sign of change, or of approximation to the small-pox.

"In order the more effectually to remove all prejudices that prevail, relative to the origin and nature of the vaccine distemper, I shall adduce other arguments to prove, that it is radically and essentially different, and distinct from the small-pox.

"That celebrated physiologist Mr. Hunter, in his Treatise on the Blood, says: 'In all complicated animals, among 'which man is the most complex, the parts are composed of 'different structures; and we find that in such animals, the 'powers of action of those different structures, within themselves, are very different: when, therefore, they are excited 'to any common action, the varieties produced should be well 'known, and particularly attended to. Besides, every similar 'structure, in different animals, does not always act in the 'same manner. Thus, we cannot make a horse vomit; *nor can 'we give many specific diseases, which attack the human subject, 'to any other animal; more particularly the morbid poisons.*'

"Dr. Darwin, in his Zoonomia, sect. xxxiii. 1. 5. confirms what is here alledged by Mr. Hunter. He there endeavours to explain, why none of our contagions, as the small-pox, or measles, can be communicated to brute animals, though theirs can be communicated to mankind.

"Dr. Pearson, in his 'Inquiry concerning the history of 'the cow-pox,' says: 'Morbific poisons which produce specific diseases, act in this way only on one species of animals; 'except in a few instances, such as the hydrophobic and cow-'pox poisons. Camper, Ingenhousz, and Woodville, in 'vain attempted to produce the small-pox by inoculation, in a 'number of brute animals. J. Hunter failed, in attempting 'to excite the syphilis in a dog, by inoculating him with the 'poison of the gonorrhœa, and of a syphilitic ulcer. Camper 'attests, that in the most malignant epizootic murrain, which 'spread most rapidly among oxen, other animals, such as 'sheep, horses, asses, dogs, &c. were not infected by associating 'with the distempered oxen; nor even by feeding with them, 'in the same compartments of a stable.'

" ' In the eruptive contagious disease among sheep in France, ' forty years ago, other species of animals which associated ' with them, were not infected.

" ' The newly observed disease which prevailed among do- ' mestic cats, in 1796, throughout great part of Europe, and ' even America, did not appear to affect other animals.

" ' These observations may serve to remove the fears of those, who apprehend, that in consequence of domesticating brute creatures, we are liable to render their diseases endemial."

" An additional proof that cows are insusceptible of the small-pox, may be deduced from Dr. Woodville's reports of a series of inoculations for the variolæ vaccinæ, &c. where he asserts, that Mr. Coleman caused one of his cows to be inoculated with variolous matter, but without effect."

As the variolous has been imagined to be the root of the vaccine disease, so has the latter been imagined to be the source of the former; and this idea has had the able support of Dr. Jenner, who denies, however, the possibility of the cow-pox suffering a degeneracy through the medium of the human body. Mr. Ring strongly favours the idea, that the vaccine disease derives its origin from the *grease* of horses, but concludes that the latter is a precarious antidote, and at best an equivocal security against the contagion of small-pox.

But the most important part of this work relates to the effect of the vaccine disease on the human body, and the distinction to be made between the genuine appearance of it, and those fallacious varieties which are wholly destitute of preservative efficacy. The latter have been cautiously pointed out and described by Dr. Jenner, Dr. Pearson, and Mr. Jenner; from these, and the remarks made by himself, Mr. Ring infers the following diagnostic symptoms of spurious cow-pox, which cannot be too steadily kept in mind by practitioners, and by which all those cases ought to be tried that have been recorded as hostile to the new inoculation.

" In the spurious cow-pox," says the author, " the pustules are free from the bluish tint; they are also free from the phagedenic disposition; and are much less contagious than the genuine species of the disease." Page 53.

The principal causes of the loss of the genuine properties of cow-pox matter seem to be, 1. the transition which the cow makes, in the spring, from a poor to a nutritious diet; 2. the too great distention of the udders and nipples of those animals from neglect of milking; 3. the decomposition of the

true

true vaccine virus, either from its being taken in too advanced a state of the disease, or from being kept too long a time before it is used; 4. the degeneration of a pustule into an ulcer.

But it appears also that the vaccine disease has sometimes assumed a *varioliform* character; a subject very fully treated on by preceding authors, particularly by Drs. Pearson and Woodville. Whether this character arose from peculiarities in the constitutions of the patients, or from an actual co-influence of small-pox contagion, does not seem to be fully determined; neither do we yet know why eruptions different from the variolous sometimes occur in the true cow-pox. It also appears, that the act of inoculation with that disease must not be pronounced a certain preventive of the small-pox, or that the progress of the former infection supersedes that of the latter. It is not the commencement, or the progress, but the *maturity* of the cow-pox, or perfect disease, that is an absolute security against the infection of the small-pox.

The experience of Mr. Ring, as expressed in the following passage, deserves particular attention.

"I have inoculated," says he, "with cow-pock matter, a considerable number of persons who had previously been exposed to the infection of the small-pox, and in general succeeded in superseding that infection. In a few cases, the disease took its natural course; but, except in one instance, its virulence appeared to be greatly diminished."

We shall conclude our extracts from this first part of Mr. Ring's Treatise with the following spirited and rational vindication of the new inoculation:

"According to the new-fangled logic of the anti-vaccinists, it is not sufficient that the practice is useful, it is not sufficient that the practice is of inestimable value; it must also be perfect and infallible. According to the principles of these infallible judges, they must reject the whole practice of medicine, because it is not perfect; and even the blessing of health, because they are not invulnerable and immortal.

"To those who are not blinded with prejudice, half of what has been written on the subject must appear superfluous, had not the advocates of the new practice the secret machinations, and gross misrepresentations, of envy and jealousy to encounter. The adversaries of vaccine inoculation reason, if what they say on this topic can be called reasoning, as if it was founded on a discovery of yesterday, and not on the broad basis of long and extensive observation.

"The argument in favour of cow-pock inoculation is, that it is a preventive of the small-pox. That exceptions, or apparent exceptions, may possibly take place now and then, as in the inoculation of the small-pox itself, the most strenuous advocates of this practice may readily admit; but when the enemies of vaccine inoculation pronounce judgment against it on that account, we appeal with confidence to the tribunal of the public.

"So far is prejudice capable of influencing even minds in other respects enlightened, that a very respectable member of the medical profession declared in public, if the spurious cow-pox was liable to be mistaken for the genuine, the practice of vaccine inoculation ought to be damned. A little reflection, however, will convince that gentleman, that such a censure will fall more heavily on the inoculation of the small-pox, which he approves of. If the false cow-pock matter be employed, the error will as easily be detected, as when a wrong sort of matter is used instead of the variolous; and a practitioner who has committed that error, will, if he is qualified for the duties of his profession, either consult the writings of Jenner, in order to learn the true characteristics of the disease, or procure matter from those who are better judges than himself.

"It is difficult for practitioners in general to procure matter from the cow; and therefore a few of those who are most engaged in the cow-pock inoculation, and are able to preserve the species, are in the habit of supplying others. This matter, in the hands of several individuals, has sustained a trial which the variolous matter never sustained. Every method of infecting with the small-pox those who have undergone the vaccine inoculation has been tried; but tried in vain. The virus, which is so perpetuated, and is able to abide such a test, is more certain to be genuine, than that which is commonly employed in inoculation for the small-pox.

"These remarks appeared to me necessary. They may serve, in some measure, to disperse the mist of prejudice, which those who are hostile to the practice have laboured to excite. These gentlemen, either not knowing, or not acknowledging its utility, call that enthusiasm in its favour, with which others are inspired, madness. Would to heaven, this madness were a little more infectious!

"That the cow-pox is, beyond all comparison, a milder and safer disease than the small-pox, is now generally understood, and acknowledged. That it is an effectual security against

against the small-pox, abundant proof has already been advanced."

The succeeding pages of the work are devoted to a review of such as have preceded it, to a history of the progress of vaccine inoculation in distant countries, to the correction of mistakes made by various practitioners, and to the obviation of objections and misrepresentations. Highly as we respect the manliness and ability with which Mr. Ring meets the arguments, and refutes the objections of those who are inimical to the new inoculation, yet we cannot forbear expressing our disapprobation of the harshness and sarcasm which he so frequently employs. Surely it is not consistent with candour to impute interested motives to all who may happen to be sceptical with respect to the ultimate success of a new plan; nor is it reasonable to charge persons entertaining an opinion opposite to our own with ignorance, or perversion of understanding. Doubt (it has been said by an ingenious writer) is the parent of wisdom; and perhaps less real detriment has been done to science, and to society, by hesitation in admitting new opinions, than by premature acquiescence and unqualified confidence in them. We are persuaded that Mr. Ring's endeavours to explain the nature, and defend the introduction of the vaccine disease, had their origin in zeal for the public good, and we must, therefore, regret his employing any weapons unworthy of so exalted a cause, or of a philosophic inquiry after truth.

Art. IV. Bell's *Principles of Surgery, Vol. I.*

(Concluded from page 378.)

The "Description of Aneurism" begins in the following curious identifying exemplification: "Aneurism, when it arises without blow or hurt, steals on slowly. A small tumour is felt, for instance, in the ham; it is small at first, and firm, and but little affected by the pulsation of the artery. It lies deep among the flesh, and must be felt for by working in the fingers, and pressing aside the adjacent parts. It is supposed to be a knot or kernel, has little pain, is neglected for many weeks, and might be mistaken even by a surgeon for a swelled gland. This little tumour grows, and beats more strongly; but an ignorant, hard-working man is not easily alarmed, nor willing to forsake the daily labours by which he provides for his

his family. Still the tumour beats strongly, and the patient is at times alarmed; there is an unaccountable heaviness, pain, and numbness through all the limb, and by those shooting pains, and this heavy lameness, he is obliged to ask advice. The surgeon, with marks so decisive as these, knows this throbbing tumour to be an aneurism; he offers the man his assistance, begs him to submit to regimen, low diet, confinement, and a gentle bandage; he advises him to go to an hospital; but the patient is unwilling to think thus seriously of his disease.

"From week to week this poor man works and rests alternately, is careless of the limb, still hoping that it is but a slight complaint, till at last, by *pain*, *lameness*, he is confined to bed, and by the intense throbbing he is truly alarmed. The surgeon, now called again, is also seriously alarmed; he finds the tumour throbbing strongly, increasing rapidly, beginning to fill up the cavity of the ham, yet too painful and too much inflamed to suffer compression; but while he is hesitating what to do, or whether an operation may be proposed, it often happens that a second aneurism begins to form in the other ham.

"In a few weeks this ham also is distended with a hard, firm, and throbbing tumour, hard as a stone, and rising strongly with each pulse of the artery. The leg becomes œdematous, the thigh swells, the whole limb becomes heavy, cold, and pulseless; perhaps the pulsation in the tumour ceases, but the parts still continue thick, the tumour firm, but not yet threatening to burst. After some weeks of suffering, another tumour appears in the opposite thigh, and as if from the greater power of the femoral artery, or from the whole arterial system being predisposed to disease, this third aneurism increases with a rapidity wholly alarming. Which of these great aneurisms shall burst and be the cause of death, seems long doubtful, till, as if the greater aneurism of the thigh had drawn the blood to itself, the progress of the original tumour is no longer observed, the aneurism of the thigh increases from day to day, and the patient, now weakened by many months confinement, is quite exhausted with pain and fever, and constant suffering. If he survive, the greater tumour becomes livid, the skin becomes thinner from day to day, but not softer; it is parched and hard as if from want of nourishment; it cracks and scabs, and then blood issues through the crevices. For ten days he is sensible of approaching death, and asks for opiates that he may die quietly; at last the blood bursts out, he immediately faints, but is saved from this first

hæmorrhagy;

hæmorrhagy; he falls low, is seized with sickness and vomiting; a low delirium comes on, and the next morning, after a slight discharge of blood, he expires." Page 312.

This strange narrative of a supposed particular case is held up to the student as an illustration of a disease which originates under infinite varieties of symptoms and locality; it cannot be seriously meant to attract the attention of any class of readers. Would any man gravely attempt to display a system of any art or science (in this age) before he had explained and discussed any of the rudiments, the data, or first principles, from whence his doctrines are to proceed; but in the work before us it is even thus. We are suddenly drawn into practical narrations, and histories of particular symptoms, without any previous definitions. Will the unfortunate student, under such a system, emerge from his closet any better than an empiric? Will he, from such systems, derive any sources of general reflection to guide him in new, and, to his practice, unprecedented cases; or will he necessarily cling to the "dead letter" of his book, and wade through a life of blundering practice devoid of scientific principles? We cannot hesitate to pronounce our verdict in favour of this last supposition. We trust that the public will agree with us in blaming, without reserve, whatever may spread such calamities as these through a great profession under the cloak of a book. It is indeed no trifle to fascinate the minds of novice practitioners in surgery by the splendour of plates, and the imposing appearance of a bibliothecal work; but it is the painful duty of the reviewer and critic to unveil such productions.

The whole history and treatment of aneurisms occupies above three hundred pages; it is made up chiefly of relations of particular cases in detail, which are to be found in every surgeon's library, and which are by no means suited to fill up a work under the title of "Principles." Good cases are, indeed, the legal precedents of medicine; they are in themselves a rich store for the guidance of the most scientific practitioner; but they ought never to have been confounded with principles and systems; as well might a natural philosopher write a book on the principles of physics, and employ his entire discourse on the weights which certain levers, axles, pullies, &c. will raise, and the various experiments which philosophers and conjurers have made with the mechanical powers, passing by the explanation of all the geometrical illustrations of those principles on which such powers act. Our author, like some other modern surgeons, seems to place all his merit to the

account

account of a dashing boldness at operations; he seems to place no reliance on the efficacy of medicine, nor indeed does medicinal treatment at all correspond with the vehement desire which he displays for desperation. In a few short rules for practice, after the long history of aneurism, he says, " do not *piddle* at this operation, as if it were some ordinary business, nor look timorously in the sac, soaking up with cloths and sponges that blood which you should not allow to flow; hiding the danger in this way is but increasing it; meet the danger like a bold and well-instructed surgeon ; do not be afraid to see the mouth of a wounded femoral artery ; look your enemy in the face ! cut the skin *as slowly as you will*, but slit up the sac rapidly, spread it wide, look down to the bottom, be directed by feeling the warm blood upon your finger, or by seeing the jet of florid blood ! for the moment you *see* the artery, *all danger* is over." Page 427.

What shall we say to this intemperate representation of a surgical operation ? Is this language likely to fortify the mind of a young surgeon ; to give him calmness and self-possession, whilst the life of a fellow-being quivers under his knife ? surely not. In every page we have to regret that some good practical information is drowned by a medley of extraneous matter, or by an impassioned language which ill becomes a teacher of an art requiring, above all others, the most sedate, collected, and mild-tempered frame of mind.

The twelfth discourse is on " Fractures of the Limbs." This subject is divided in five sections; but here, as well as in the preceding parts of the work, those limitations to the subject are seldom adhered to, and a strange running-title accompanies every page ; such as, " Gangrene from tight Bandage not uncommon"—" Mechanical Notions of Callus"—" Fabricius breaks distorted Limbs"—" Foubert extends the Limb every twelve hours"—Dessault's *maxim* refuted"—and one runs thus ; " The *Undertaker* should be a dextrous *Knivesman*."—At the *end* of this discourse comes " Definitions of the various Species of Fractures," which, as usual, are held to be divided into the simple and compound.

Throughout the whole of this essay we do not find a single instance of advice relative to medicinal treatment. What ! does the author consider it useless to regulate the general system during the different stages of fractures ? or does he intend that his students should hunt for such information elsewhere ? The idle tales and opinions of obsolete authors are made the subjects of pathological and physiological discussions, which are

are dogmatically handled, with little reference to the instruction of the reader, and a great share of wrangling propensity, the consequences of which in no way relate to the *principles* of surgery; whereas the most needful lessons on the practical duties of a young surgeon appear to be totally overlooked.

Discourse XIII. "On the Anatomy and Accidents of the Hip Joint," commences with an elaborate account of *some parts* of the anatomy of the hip joint. These anatomical descriptions partake of the "*impassioned* language," so prevalent in all the histories of surgical operations; for although much of the merit which attaches to accurate representations in detail belongs to our author, yet his unsystematic wanderings from the subject tend to obscure and confuse even the simplest things..

The titles of sections, or chapters, in this discourse, are as follow:

"General Pathology of the Hip Joint.

"Pathology of Luxation.

"Of Luxation of the *Femur* downwards.

"Luxation of the *Thigh Bone* upwards.

"Pathology of Fracture of the Thigh Bone.

"Why is *the* Fracture incurable?

"Pathology of the diseased Acetabulum, or Affection of the soft Parts within the Hip Joint.

"Of the scrophulous Disease of *Boys*, or the Disease of the Bones which compose the Hip Joint."

The "Conclusion" embraces five sections of what are termed "Diognosis recapitulated," of which the two following are specimens: "First, we are assured that the thigh bone is luxated downwards, when the accident has been a *twist* of the limb, or a blow upon the very top of the great trochanter, when the thigh is elongated three inches or more, the toe turned outwards in a *splay-foot* posture, and kept *straddling* away from the body with great pain. This luxation is accompanied with a proportioned *displacement* of the great trochanter; the hip is flattened, and in lean people you can distinguish the head of the bone rolling in the groin, though not in fat *subjects*, nor in women whose *pelvis is* broad and flat."

Again, "Fifthly, when a scrophulous boy, under 18 years of age, has laboured for long under a disease of this joint, where there is great lameness, little pain, a puffy swelling, an elongation of the limb! if there come at last acute pain, hectic fever, symptoms of internal suppuration, and at last an abscess upon the hip or groin, you know that it is the constitu-

tional disease, that it is seated in the bones, that it is analogous to the white swelling of the knee, or curvature of the spine; but, unlike the disease of the knee joint, this of the hip cannot be amputated, and the boy must go through the fiery ordeal, and often dies from fever and irritation, great profusion of matter, and caries of the bones. If he survive, it is usually with a limb emaciated, crooked, hanging in air, and fixed by the anchylosis of the femur with the haunch bone. The chief cause of such disease is the scrophulous condition of the system, the imperfect ossification of the bones, the great extent of diseased surface, and from the occasional shocks which this great joint suffers, in consequence of its supporting continually the whole weight of the body. The chief danger of the disease, is the boy feeling but too little pain to make himself or his parents sensible of the danger: if it be not chiefly in consequence of the pressure and motion that such disease goes on to the last stage of caries, yet certain it is, that under the pressure of the whole weight of the body such a disease cannot be cured; the only chance, then, of recovery is from wine, generous diet, cold bathing, caustics, issues, and absolute rest." Page 505.

The reader will here observe a propensity to identify and to give individual form where it is quite improper. We are at a loss to *divine* the motives which could actuate a professional gentleman, high in character and in esteem among his brethren at a great university, to commit his reputation, throughout a work, on the profession, in which he seems to be a great practitioner, by leaving so much open to censure.

The fourteenth Discourse, on "Fractures of the Thigh Bone, and of the irresistible Contractions of the Muscles and shortening of the Limb," begins with some anatomical descriptions concerning the muscles which are attached between the bones of the pelvis and the thigh bone. Our author conceives, that "the shortening of the limb proceeds from natural causes, which perhaps no power of machinery can ever counteract." From hence we are led into a labyrinth of discussions about various antiquated modes of treating fractures of the thigh bone, with representations of apparatus; the greater part of them, with due respect to the author, we conceive, might have been omitted without the student suffering any loss. In the treatment of these fractures, this teacher lays aside all the implements of art, and recommends stretching the limb upon a well-made pillow, that it be extended from day to day, "that we stretch it gently, model it with our hands, lay it out smooth,

stretch

stretch and replace it from time to time. It is my privilege," he concludes, " while I deliver the history of those machines, to express my opinion, to say how imperfect I think the principles are, how impossible it is to resist the contractions of a powerful and muscular thigh." We would ask, whether this be any other than the general opinion of all practitioners at the present moment? and if so, why take up twenty-seven quarto pages with the subject, and tax the profession with twelve copper-plates?

The fifteenth and last Discourse is entitled, " Rules for the Management of simple, compound, and gun-shot Fractures," &c. &c. The heads of this Discourse are,

" The Definitions of Fractures repeated.
" Danger of Rollers.
" Explanation of the Terms of *Art.*
" Rules for the Setting of simple Fractures."
" Fracture of the *Breast-bone.*
" Fracture of the Collar-bone.
" Fracture of the Spine.
" *The* Patella," &c. &c. &c.

Then comes a conclusion, under the title of " General Observations, and General Observations concluded." We hoped that now our labour was ended, but no; our author relapses again into " Rules for compound Fracture—Of carrying *the* Patient—Of reducing the protruded Bone—Of *securing* the bleeding Arteries—Of reducing the protruded Thigh-bone—Of the Recovery of the protruded Bone—Of dressing the Wound—Of the Stage of Suppuration—Of gun-shot Fracture—Of compound Fracture and Luxation—Of the Question of Amputation."—Again we are led through a maze of cases, stories, and criticisms, foreign to the purport of a modern system of surgery, until the last page arrives with this running-title—" *There can be no absolute Rule!!!*" The reader will therefore accept our author's farewell paragraph, with perhaps the same wish that irresistibly affects us, viz. that he may bring forth his next volume with more of arrangement, less " impassioned language," and with none of these extraneous quotations and wranglings which, whilst they swell his book beyond reasonable and fair limits, they serve to render every original piece of information peculiar to himself both obscure and difficult of access. From the want of a copious index, which is unpardonable, it will be found almost impossible to come at any particular opinion, or point of practical information, without wading through a mass of unprofitable materials, which ought

never to have been combined with such subjects. We apprehend, that at one sixth the cost, and in as small a proportion of bulk, our author might have made a respectable and useful work.

"It is with the hopes of awakening your attention to a great and important question, that I have touched upon it in this place; and it is to furnish you with matter for reflection, that I have been at pains, through all this *tedious* volume, to lay before you, in a minute, particular, and somewhat of a *dramatic* form, the most ordinary accidents of practice. When such difficulties come upon you, read, reflect, retire within yourselves! and may you, as you advance in years, have the comfort of believing that you have, on every trying occasion, conducted yourselves with honour, integrity, and prudence: it is a happiness which, in our uncertain profession, no human wisdom nor diligence can absolutely ensure." Concluding paragraph, page 673.

ART. V. *New Progress of Surgery in France, or Phenomena in the animal Kingdom.* Published by Command of the French Government. Translated from the French of IMBERT DELONNES, M. D. by T. CHAVERNAC, Surgeon. Embellished with very curious Plates by W. NUTTER. Printed for and sold by the Translator, N° 17, Leicester Square, London. Quarto. 1801. Price 4s.

THE title of this pamphlet may possibly induce the English reader to look for its arrival into his hands with eagerness; but alas! how vain will have been his hopes, when he receives thirty-one pages of such bloated puffing narrative from this self-created hero, as we never before witnessed in any sort of medical literature, saving, indeed, the quack advertisements of the day, and they are far behind our author in egotism and vanity.

That two cases of operations, the one for a sarcocele, the other for a sarcomatous tumour growing from the nose, should have occupied the attention of the "French Government," or that they should have sanctioned the publication of such a rhapsody, is almost incredible. Had this statement been correct, we apprehend that our author would very gladly have given his readers a full-length copy of the official document which "commanded" him to trumpet forth his own glory in such loud tones.

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The commonwealth of letters ought, at least on scientific and medical subjects, to be unshackled, and the professors ought to be reciprocally charitable. We should be truly sorry to evince any national spirit towards foreign authors, but it is our duty to warn our countrymen of quackery in every shape.

The two cases which constitute this pamphlet are, first, that of Charles Delacroix, Ex-minister, &c. and the other of Perier de Gurat, late Mayor of Angouleme. The first is of a large sarcocele, weighing 28lbs. which was successfully extirpated from a healthy man, aged 58, an operation, we will venture to affirm, which would have been performed in any of the London hospitals. The case of Perier de Gurat was a flabby tumour in the skin of the nose, which is related to have "*hermetically sealed* both his nostrils and mouth ! ! !"

If there be nothing more intended by this pamphlet than meets the eye, we should be at a loss to account for the motives which induced its author to publish such a ridiculous vaunting tale. Had these cases been decently related, they might have gained the operator a character for boldness, and perhaps for dexterity; but as there is nothing discovered from his practice, and the events are precisely what every hospital surgeon would predict, we cannot perceive the necessity for that ludicrous exultation which mixes in every sentence.

The operation on Charles Delacroix is stated to have occupied two hours and a half, including the intervals of rest; these intervals were five, and they lasted from seven to eight minutes each; which respites seem to have been called for at the instance of the patient, who is, by this means, said to have "resumed sufficient powers to bear the operation to its end." In all tedious and painful operations, we have invariably noticed the refreshment and comfort derived to the sufferer by occasional respites, and this operation taking up an hour and three quarters in painful dissection, fully illustrates that observation. "Doctors differ," in France as well as here; for Dr. Delonnes is at open war with his contemporaries.

FOREIGN BOOKS.

ART. VI. *Theorie et Pratique de l'Inoculation de la Vaccine, precedée d'un Tableau comparatif des Avantages de l'Inoculation ordinaire sur la Petite-vérole naturelle; et suivie des Observations et Rapports, publiés sur a Sujets, tant en France q'uen Angleterre:* i. e. *The Theory and Practice of Inoculation by the Cow-pock, preceded*

preceded by a comparative View of the Advantages of the ordinary Inoculation over the natural Small-pox, and followed by Observations and Reports published on this Subject, as well in France as in England. By H. RANQUE. Octavo. With plates.

If we were to tell a man of sense, that there existed in Europe a contagious disorder which carried off an eighth part of the human species; that many of those who escaped its malignity were mutilated or deformed; that long and incurable affections were frequently the consequences; that it often changed the most delicate beauty into an hideous mask: if we should afterwards tell this man, that there existed a sure means of opposing the terrible effects of this disorder, and in some degree preventing it; that these means reduced the mortality from one thousand to one, diminished the number of persons otherwise injured, and, in a word, rendered it much less dangerous: if we should add, that they had substituted to these means, another method more safe and less defective; that this latter takes away almost the whole of the danger, and reduces the mortality to one in eight thousand: lastly, that not being contagious like the other, it affords a well-founded hope, that it may cause the terrible disorder, whose ravages it prevents, in the end totally to disappear: would it not be natural to reply, that even the first means ought to be looked on as a present from Heaven, and that the gratitude of every friend of man was due to him who had made it known; but that a part of this gratitude ought now to be bestowed on him who had discovered the second method? Such are the reflections occasioned by reading this book.

A rapid but exact sketch of inoculation for the small-pox and the vaccine inoculation serves as an introduction to this work. It is divided into two parts: the first contains an historical view of inoculation and its advantages over the small-pox in the natural way; the second, a history of the vaccine, and its advantages over the common inoculation. It concludes by a history of inoculations made by Dr. Jenner on individuals who had had the cow-pox in their youth; an inoculation, the failure of which proves the efficaciousness of the vaccine, as a preservation against the small-pox.

Of the history of the common inoculation, M. Ranque says, That known in Africa and Asia, and some parts of Europe, it was not until 1721 that Lady Montagu, having seen the practice of inoculation at Constantinople, conceived the project

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of introducing it into her native country, and London was the first place in the north where they inoculated. It was attended with the happiest consequences. Some celebrated physicians adopted the method, and carried it to Holland, Swisserland, and Russia. France was more tardy in admitting it, where it was opposed by many prejudices, which time alone could overcome.

After this short history, our author proceeds to combat some objections which have been made to inoculation, and which are now again produced. These being well known, we shall pass them over, and proceed to the second part; in which the author observes, that although the danger of the common inoculation is small, yet that some danger still exists. It appears, that of one thousand only three to five perish, and forty more are by inoculation thrown into an alarming state; to which it may be added, that the contagion being by this means disseminated, the mortality is increased, and that there are families, constitutions, and circumstances, which render the common inoculation dangerous. A method of obviating these inconveniences must be desired, and this means is found in the vaccine inoculation, or the small-pox of cows. Experience, and the observations of Dr. Woodville, prove, that of four thousand persons inoculated in this way one only perished: of these four thousand, two thousand have been afterwards inoculated by the small-pox, and none of them have been infected. From all that can be collected from tradition, in the countries where this disorder is common, no one who has had it, have either naturally or artificially had the small-pox. Once inoculated, or *vaccined*, or if a person has had the small-pox naturally, they are no longer subject to contract the small or cow-pock. Lastly, what alone ought to make it be looked on as preferable to inoculation is, that it is not contagious, neither clothes nor linen communicate it. After having thus given a comparative view of common and vaccine inoculation, the Doctor expresses the origin of the vaccine; its method of appearance; the precautions necessary in the choice of the virus; the manner of inoculation; the proper regimen; and the most convenient season.

The cow-pox appears to have been known from time immemorial, not only in the county of Gloucester in England, but in Ireland and Holstein. The cows are subject to little ulcerous eruptions on their udder; these eruptions are transparent; they contain a serous fluid, which soon dies, and then becomes smooth, shining, and brittle; it oxydates the lancets dipped in

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it very quickly, and will not communicate the infection, except where the body is deprived of the epidermis, and the effect is confined to that part alone; its course is analogous to the small-pox virus; the period of its developement, and its action on the system, is twenty days; the fourth day after the insertion the wound appears red, the fifth a vesiculous tumour appears whose diameter is constantly increasing; the eighth day a slight fever comes on, the centre of the tumour falls in, and the sides rise, there is a pain in the arm pits, and a stiffness in moving the arm; the ninth the sides of the tumour presents a circle of a fine red, which extends to three inches diameter; the eleventh the symptoms of pain and uneasiness grow less, and the colour of the circle is more lively; the vesicle, more swollen, presents on the sides a pearly appearance; and in the middle is a little black point, which is the beginning of the cicatrix, and encloses a limpid fluid, having the properties we have above pointed out; the desiccation takes place by degrees, and at last the scale falls off without any suppuration, between the twentieth and thertieth day after the insertion.

If we compare the two methods of inoculation, we shall see, that the first causes little or no fever, which lasts only thirty-six hours; that the pains in the arm-pits and the swelling of the axillary glands are scarcely sensible; and that on the twelfth or thirteenth day the patient is fully convalescent. This rapid progress seems to arise from the absence of the eruption, which latter occasions all the danger in the small-pox, either natural or artificial; let this be compared with the symptoms of the inoculated small-pox, and the difference will be very striking. It appears, from experiments hitherto made, that the vaccine is not contagious, nor does it communicate except in case of a solution of continuity. By tables made by M. Odier of Geneva it appears, that the number of children under three years old who perish by the natural small-pox, is in the proportion of 0.583; from whence it follows, that inoculation being almost always dangerous for children under that age, the benefit of that practice is lost to half the human race; an inconvenience which does not exist in the vaccine; for of one hundred and three children inoculated by Dr. Woodville, thirty-one had not the fever, and seventy-two had it very slightly; and of eight thousand persons thus inoculated, one only perished, and even this death was caused by circumstances foreign to the vaccine. A great number have been inoculated again for the small-pox, and exposed to the variolic effluvia, but

have resisted. In other respects, this probability is daily increasing; and we may assert, that in the eye of every impartial man, it is reduced to a certainty.

The author then describes a kind of bastard cow-pox analogous to the flying small-pox, and points out the method of discovering it. The characteristic sign, is its developement before the fourth day; he afterwards points out the manner in which the cows are affected, prescribes the choice of the virus which ought to be taken from the eruption on the eighth, ninth, or tenth day, and should be limpid. Prudence requires that it should be taken only from a healthy person, and who has only a local eruption. When the operation is performed from arm to arm, it is sufficient to pierce one of the eruptions on its side with a lancet, and then make three punctures on each arm of the individual who is to be inoculated. If the virus is to be sent to any distance, a thread may be impregnated, or it may be received on two plates of glass, which may be put together, and the sides closed by wax. The operation should be made on each arm. The method by puncture is to be preferred, but when the third is used, a slight and superficial incision should be made, and the thread secured by a compress. This is useless in the case of a puncture; the application of all fat substances opposes the developement of the virus, or alters it; some slight eruptions sometimes appear on the parts, but a lotion of Goulard water will make them disappear. As the vaccine inoculation causes only a slight indisposition, any particular treatment is unnecessary, and extraordinary cases must be left to the judgment of the physician; the spring appears the best season for this operation.

The work concludes with a history of the inoculations made by Dr. Jenner. [*Journ. de la Lit. Fr. et Etrang.*

ART. VII. *Traité des Moyens de desinfecter l'Air, de prevenir la Contagion, et d'en arrêter les Progres:* i.e. *A Treatise on the Means of purifying the Air, of preventing Contagion, and of stopping its Progress.* By J. B. GUYTON DE MORVEAU. Octavo. 306 pages. 4 livres.

CITIZEN Morveau has employed himself in these researches for upwards of twenty-five years. During the continuance of the epidemical disorder, which reigned at Genoa in the year 8, and which carried off five hundred of the in-

habitants in one day, he caused to be inserted in the *Citoyen Français*, of the 16th Thermidor of that year, a letter, in which he summarily noticed the custom which had prevailed in 1778, of using fumigations of mineral acids to purify the air infected by putrid emanations; the judgments which many learned societies had passed on this method of stopping contagion, and the success it had experienced, particularly in the case of the *hospital fever*, which was then generally acknowledged to be the cause of that disorder.

Since that time, he has employed himself in collecting and arranging the materials for this treatise, in weighing the objections which had been taken to his new method, and in examining the effects of the remedies hitherto used in this disorder. He has found, that, except carrying off the filth, and removing the burying-places, all the other methods were of no utility. The mode of purifying the air by acid fumigations had been known and practised at Madrid three years before the epidemical disorder at Cadiz; notwithstanding which, they made no use of it in that city, while at Seville they experienced from it the most happy effects.

The work now before us is worthy of the attention of all governments, and of the directors of hospitals in particular. It is divided into four parts, which treat historically of the first trials of fumigation by the muriatic acid; of the experiments which have been made of it in the Russian and English fleets; and the method of fumigation adopted in Spain. The author, in the first section, examines the effects of acid fumigations, as established by many experiments cited in the work; the opinions which have prevailed on that subject, and the consequences which may be drawn from the experiments, which are to the number of twenty-four. In the second section of this part, he treats of this subject in a chemical point of view, and of the principles which may assist in fixing on the best means of correcting the unhealthiness of the air, and of stopping the progress of contagion; of the influence of oxygen in expelling contagion, and of the oxygenating substances, and particularly of the oxygenated muriatic acid, considered as a preservative against contagion, and if the same means should be employed in the different species of infection.

In the fourth part he points out the true anti-contagious preservatives, and the manner of using them, with the regimen proper to be pursued. [*Journ. Gen. de la Lit. de la Franç.*

ART.

ART. VIII. *Receuil des Memoires, d'Observations, et d'Experiences, sur l' Inoculation de la Vaccine:* i. e. *A Collection of Memorials, Observations, and Experiments, on Inoculation by the Cow-pox.* Octavo. 57 pages. 75 cent.

THIS collection contains, 1. An historical Account of the Cow-pox, by Cit. *Aubert*—2. A Memoir of Dr. *Odier*—and, 3. Experiments made at Paris by the Medical Committee, extracted from their Reports of the 28th of Vendemaire and the 20th of Brumaire in the 9th Year.

[*Journ. Gen. de la Lit. de Franç. N° V. 9th Year.*

ART. IX. *Les Dangers de la Vaccine demontres, &c.:* i. e. *The Dangers of the vaccine Inoculation demonstrated by authentic Facts, contained in some Memoirs and different Letters. Addressed to the Medical and Central Committee established at Paris, to make Experiments on this new Kind of Speculation.*

[Journn. Gen. de la Lit. de Franç. N° V. 9th Year.

MEDICAL INTELLIGENCE.

Art. 10. *Substitute for James's Powder.*

MR. Chenevix, whose ardour in chemical researches is well known, has lately published a method of preparing James's powder in the moist way, which, we think, would be a great improvement. In speaking of the manner in which the *pulvis antimonialis* is prepared, he observes, that we are told to take equal weights of bone or hartshorn shavings, and crude antimony, and calcine them together at a high temperature; in other words, to take phosphat of lime, which already contains a great excess of lime, and add to it an oxyd of antimony. In this process it has been supposed, that the phosphoric acid of the bone, or hartshorn, will saturate not only the lime with which it was originally combined, but in addition to it, a new portion of metallic oxyd, and a new portion of lime.

Every oxyd of antimony with which we are acquainted, is, Mr. C. observes, volatile at a high degree of heat; it would, therefore, be hazardous to assert, that it is possible to preserve always the same portion of antimony, whatever care may be employed

ployed in directing the operation; and a dissimilarity in the chemical result must necessarily be attended with uncertainty in the medical application.

To this property may be added another, no less conducive to error: that portion of oxyd of antimony which is not volatilized becomes, in a great measure, insoluble in all the acids. What the effect of the gastric juice may be upon a substance which resists the action even of the nitro-muriatic acid, it is not his purpose to determine; it is sufficient to observe, that as the quantity of insoluble matter in a given quantity of Dr. James's powder, prepared at different times, may vary, the effect of any dose may also differ according to the proportions of soluble and insoluble matter.

To avoid these inconveniences, and to produce a substance, which, from its more certain mode of preparation, may be more equal and constant in its effects, Mr. C. recommends the following process:

Dissolve together, or separately, equal parts of white oxyd of antimony, and of phosphat of lime; pour this solution gradually into distilled water previously alkalizated by a sufficient quantity of ammonia: a white and abundant precipitate will take place, which, when well washed and dried, is the powder required.

In order to procure the phosphate of lime, he dissolved in muriatic acid a quantity of calcined bone, and precipitated by ammonia in its state of greatest causticity. By this means the excess of muriatic acid, which held the phosphat of lime in solution, is saturated, and the phospat is precipitated; but no muriate of lime is decomposed, provided the ammonia be quite free from carbonic acid. This is the most direct method of obtaining phosphat of lime pure. This salt is not decomposed, as some have asserted, by muriatic acid, but merely dissolved by it. The oxyd of antimony he obtained by precipitating by water the common butter of antimony of the shops.

It may be useful to remark to those who wish to make this preparation, that it is absolutely necessary that the solution of phosphat of lime and oxyd of antimony in muriatic acid should, after being well mixed, be poured *into the alkaline liquor*, in order to obtain a precipitate homogeneous throughout the operation. For, should the alkaline liquor be poured *into the acid solution*, the water of the former would act upon the entire mass of oxyd of antimony, while the alkali would precipitate the phosphat of lime only as it saturated the acid which held that salt in solution: thus the precipitate would

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contain more antimony in the beginning, and towards the end the phosphat of lime would be predominant. For the same reason too a pure alkali is preferable to its carbonate; because the carbonic acid disengaged would retain in solution a portion of phosphat of lime.

Whether this composition be a chemical combination, or a mixture, Mr. C. will not take upon him to determine. At all events, he observes, it must be more homogeneous than any that can be prepared in the dry way. It is entirely soluble in every acid that can dissolve either phosphat of lime or oxyd of antimony separately; and to have it constantly and uniformly the same, no further address in preparing it is required than to avoid the errors that have been mentioned.

Mr. C. gave some of this powder to several medical friends of acknowledged skill and extensive practice, who, after trying it, all concurred in opinion, that in its general effects it agrees with James's powders and the *pulvis antimonialis*; but that it is more mild, and consequently may be given in larger quantities, seldom producing nausea or vomiting in doses less than eight or ten grains.

Art. 11. *Dr. Nisbet's intended Publications.*

Dr. Nisbet's work on Cancer, we understand, is ready for the press; it is entitled, "An Inquiry into the Principles to be adopted in the Treatment of cancerous Complaints; shewing the Success of Carbonates, and Medicines acting from their Possession of the carbonic Principle, in the Cure of such Affections."—From the pen also of the same author, an extensive work will appear in February next, under the title of "The Edinburgh School of Medicine." This work is intended as the completion of the Doctor's plan proposed in his "Clinical Guide." It comprehends the fundamental or preliminary branches of professional education in anatomy, medical chemistry, and botany. This work, with the parts already published, is intended to form a complete system of medical education and practice.

Art. 12. *Mr. Blair's surgical Lectures.*

On Tuesday the 26th of January, at eight o'clock in the evening, Mr. Blair will commence his spring course of Clinical Lectures on the Diseases and Operations of Surgery, at the Bloomsbury Dispensary in Great Russel Street. These lectures will be continued every Tuesday, Thursday, and Saturday.

Art.

Art. 13. *Dr. Garnett's Lectures.*

On Tuesday, January 19, at eight o'clock in the evening, Dr. Garnett will commence a course of lectures on *Chemistry*; comprehending all the modern discoveries in that science, with its application to the different arts and manufactures, particularly pharmacy, medicine, and agriculture. The course will consist of about forty lectures, two of which will be delivered every week, viz. on Tuesday and Thursday, at eight o'clock in the evening, till it be completed. A short course of *Mineralogy* will be introduced in the forenoon, which those who subscribe to the chemical course will be allowed to attend.

On Wednesday, January the 20th, at eight o'clock in the evening, he will commence a course of lectures on *Zoonomia*, or the Laws of animal Life; in which a popular view will be given of the animal economy, and the laws by which its different functions are regulated, with the methods of preventing and curing diseases. The object of the lecturer will be to render this course interesting, not only to students of medicine, but to all who think the study of the human frame a subject worthy their inquiry.

This course will consist of not less than fifteen lectures, one of which will be delivered every Wednesday evening at eight o'clock.

For particulars, application may be made to Dr. GARNETT, N° 51, Great Marlborough Street.

*** The continuations of Burserius, Wilson, and Darwin, are unavoidably postponed.

INDEX

TO THE

SEVENTH VOLUME.

Arnold,

D

E

Hallé,

I, J

K

Quackery,

Q

R

S

Tabulæ

T

U, V

W

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